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Improved Projectiles.

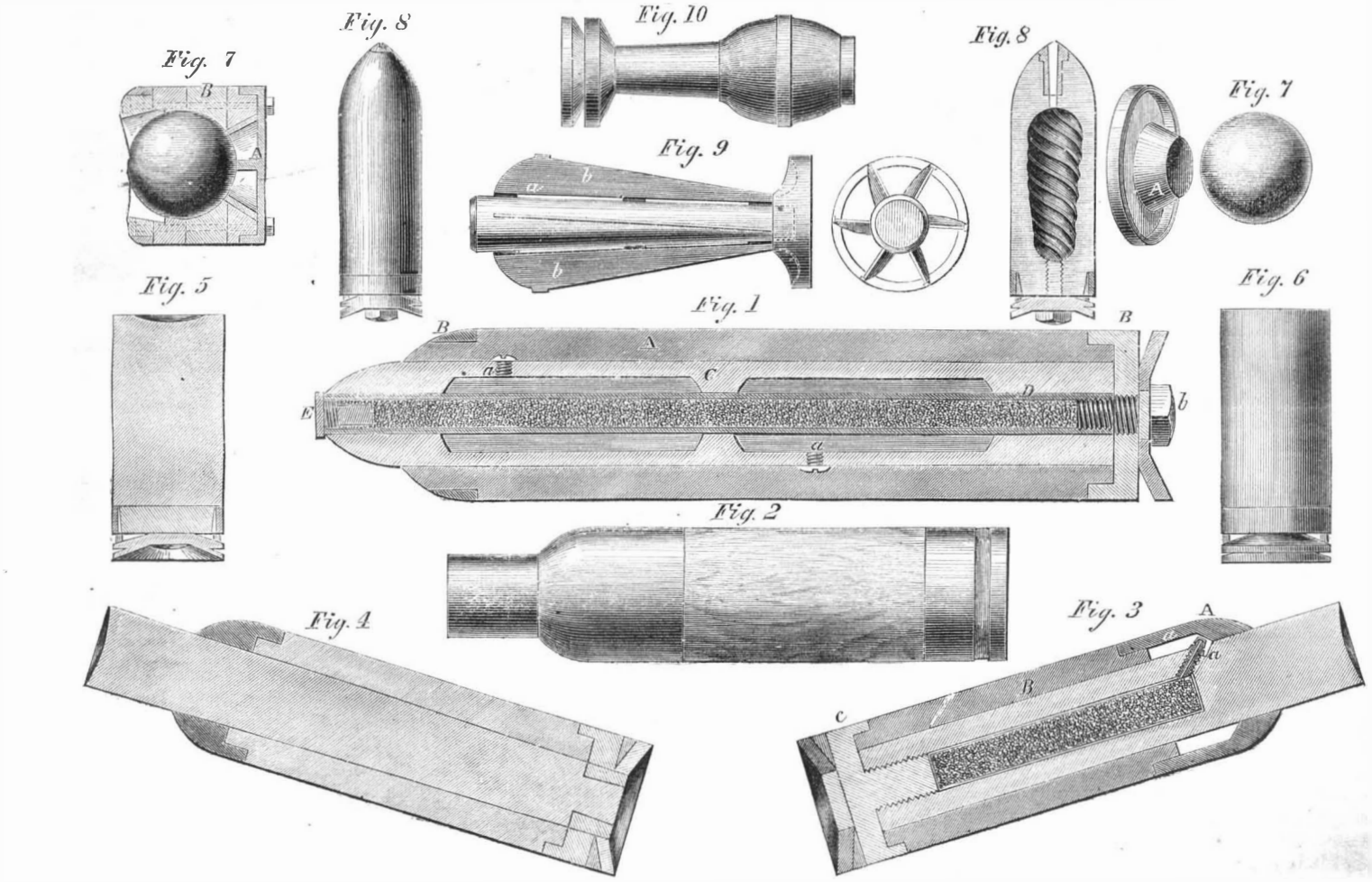
When the first note of the present war overspread the land and aroused our people to the necessity of immediate action, it found them utterly unprepared for the struggle. Betrayed on every side, our fate seemed only a swift and speedy destruction. There was scarcely a rifled gun in the country. There were batteries in abundance of the time-honored smooth-bores; there were stacks and mountains, almost, of the bomb-shells and cannon balls which in former days were so serviceable to the nation, but time had rendered these useless. Against iron-clad ships the eleven-inch guns were scarcely better than a pea-shooter against a rhinoceros; and smooth-bored batteries, in action against the long-range rifled guns supplied to the enemy by the English, were of no use at all. In this emergency, what was to be done? America seemed to be in the same condition with Poland, of whom the poet Campbell says:—

"Dropped from her nerveless grasp the shattered spear,
Closed her bright eyes, and curbed her high career."

Our inventors came to the rescue. Like the serpents' teeth sown by Cadmus, which sprang up armed men, the genius and inventive talent of the nation set to work and soon came forward, each one bearing some deadly weapon, or some improved missile, until at the present time, we fairly bristle with defenses on land and sea. Every town in the land, almost, has its peculiar rifled gun, and shot and shell of the most destructive character can be hurled into the enemy's front, or against his forts, until he gives over the struggle.

The columns of the SCIENTIFIC AMERICAN have contained, from time to time, illustrations and notices of "the grim enginery of war" in the greatest profusion, and the shot and shell herewith illustrated, will convince all intelligent persons that they are of the most formidable kind. These projectiles are those which have obtained a wide celebrity for the inventor, C. W. Stafford. Some of them are very peculiar in shape, and all of them have been proved, by practice, to possess destructive qualities of the highest order. These missiles differ materially from those in ordinary use, and the construction of them exhibits a marked departure from those beaten and well-trodden paths usually traveled by inventors. Although adapted to both smooth and rifled bores, the projectiles have no rifled grooves; they are perfectly cylindrical in shape, being neither hexagonal, nor octagonal, nor of any other form than the one previously mentioned, yet they have, when fired from the gun, as rapid and certain a rotation about their axis as any rifled projectile. Let us refer to our plate for a description of the individual shot there illustrated.

Fig. 1 is a representation of an incendiary shell, intended for dislodging an enemy from cover, or for burning his towns, ships, barricades, or other defense where he may be hidden. The long wooden case, A, is confined between two metallic caps, B; the shell,



THE CELEBRATED STAFFORD PROJECTILES.

C, is cast on the wrought-iron tube, D, and is cored out at regular intervals for the admission of an unextinguishable liquid; this is supplied through the holes, *a*, now filled by the small screws. The explosive charge is contained in the inner tube, and is fired by a time fuse, E, at the end. The base of the shell is occupied by the metallic plate secured to it by the bolt, *b*. The recess between the base of the shot and the metallic plate is wound with twine, or any fibrous substance, well lubricated, and the plate itself, at the time of the discharge, is forced into the rifle grooves of the piece, the shell remaining upon the lands; rotary motion is thus imparted, and the missile goes forth upon its errand of destruction. Wherever it lodges it is sure to burst, creating havoc and death. Fig. 2 is an elevation of one of these shells with a steel punch head on it.

Figs. 3 and 4 are what are called *sub-caliber* shot and

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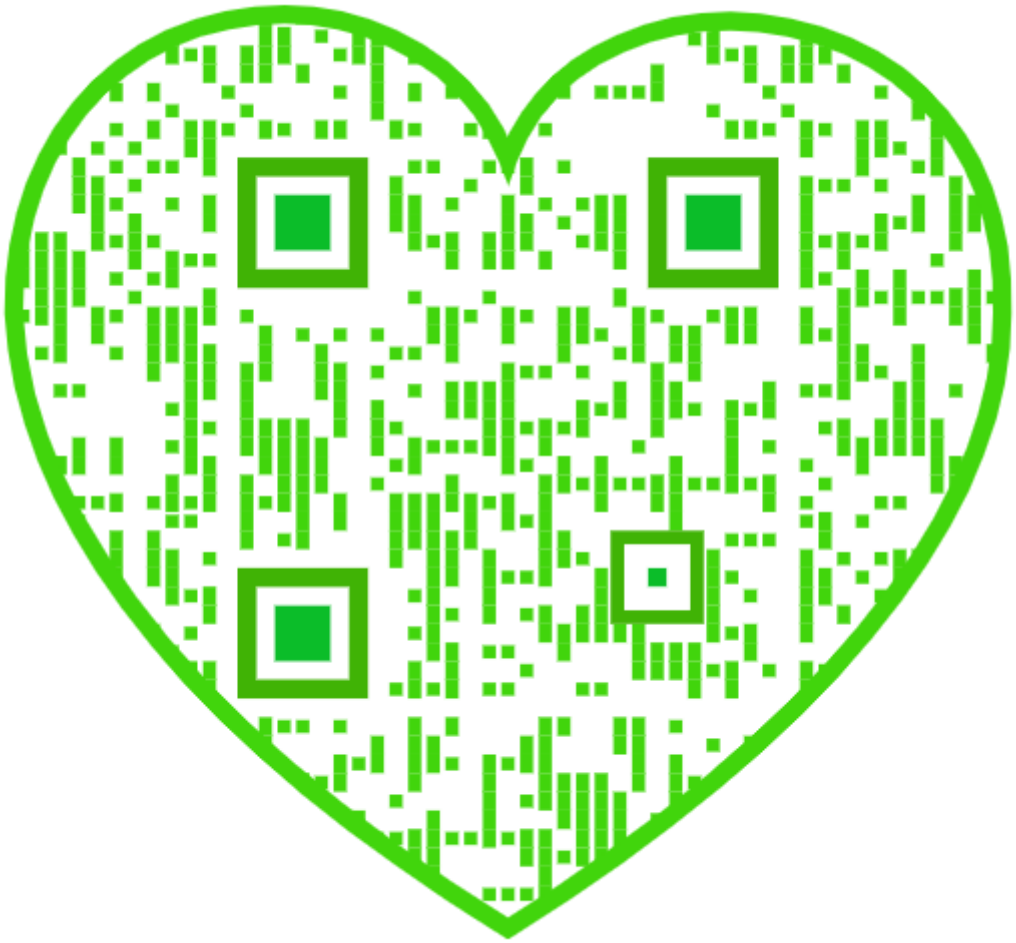

shell. The object is to impart a high velocity to a small exposed area of projectile, and this is accomplished in the following manner. The shell (Fig. 3) is a steel cylinder, bored out for the reception of the bursting charge; at the head of the shot the cast-iron case, A, is attached, and connected with the wooden body, B, by the metallic plate C, and leather heretofore mentioned. The nipple cone, *a*, is screwed into the body of the steel bolt, and explodes at the time of impact with the target; this bursting charge is composed of gun cotton and fulminating mercury. This shell has been driven through five and six inches of iron, backed with 18 inches of oak, exploding between the two substances and tearing them into fragments!

Figs. 5 and 6 are heavy cylindrical steel projectiles of great solidity and strength, and have been fired from the Dahlgren gun with the most destructive results.

The sub-caliber shot (Fig. 7) and shell (Fig. 8) are intended for the fifteen-inch smooth-bore and the Parrott rifle. The spherical shot has a bronze base, A, which is accurately turned off in the lathe, and bored out to a given diameter, the shot being a ten-inch. The wooden casing is then fitted on, and fastened to the bottom by bolts, and the space, *a*, then existing at the head of the shot, filled with plaster-of-paris; the openings in the base are treated in a similar manner. At the right hand of the engraving the plano-conoidal bottom is seen, as also the missile which accompanies it. The theory is that, when this shot is fired from the gun, the atmospheric resistance that it meets with, as well, also, the shock of the discharge, loosens the bolts, and forces the wooden packing backward, while the shot continues in its flight, propelled by the whole effective force of the gases set free behind it in the weapon. The shell (Fig. 8) has its interior corrugated, and from this peculiarity is rendered much more destructive to human life, as it bursts—it is so stated—into a greater number of pieces.

Another sub-caliber shot for the new naval guns (fifteen-inch) is represented in Fig. 9. This is a single bolt of steel supplied with a composition casting, *a*, shown in dark lines on the body. The metallic base is affixed to the bolt, and the wings or vanes, *b*, also of metal, are contained by spiral grooves in the composition bushing. The interstices are then filled with Babbit metal. Rotation around its axis is insured, it is asserted, by the action of the vanes or wings upon the air; and penetration is effected by the enormous advantage given by employing the force of the fifty-pound charge on a bolt of small diameter.

Fig. 10 is an improved metallic case for the same kind of shot, and consists of a hollow iron globe, A, riveted to the body of the projectile, the small band around it is turned off concentric with the base, thereby accurately centering the bolt with the diameter of the gun. It is asserted by the inventor that this sub-caliber bolt is able to penetrate 12 and 13 inches of iron when fired from the fifteen-inch gun!

These shot and shell possess extraordinary powers of penetration and endurance, as was shown by the target in Wall street last summer; this was composed of iron 6 inches thick, backed with oak, and was completely riddled at long range. Large quantities of these missiles are now being furnished to the Government; and all the iron-clad vessels, we believe, are to be supplied with them. The patents on these inventions, in this country and Europe, were procured through the Scientific American Patent Agency. For further information address C. W. Stafford, care of C. P. Dixon, Esq., 48 Pine street, New York.

Maxims on Onion Culture.

Moisture at the base of the bulb for any length of time is most injurious to the onion; on the other hand, a dry heat at the surface is very beneficial, as it is the sun heat alone which renders the Spanish onions so superior to the English in flavor and beauty of the bulbs. The hotter the season or the climate, the sweeter is the flavor of onions; and the colder the season or the climate, the more pungent.

The hoe should never be used among onions. In does mischief, and if an onion is once loosened its the soil it never makes much growth afterwards. So, too, the bulbs should never be earthed up; they should stand wholly above ground, and have good depth of soil to root in.

Sea-sand, salt and soot are good top-dressings for an onion bed—to be put on at least a week before sowing. Soot and guano, three parts of the first to one part of the second, is a good top-dressing for the seed bed when the seed is sown late, as it gives the young plant a good start to make up for lost time. Salad onions to be sown every three weeks, from the end of March to the end of August.

If young onions suddenly turn yellow and drop over on the ground, it is pretty certain they are attacked by *Anthomyia ceparum*. The grub which does this mischief is white, slimy, cylindrical, and from a quarter to half an inch long; it eats into the heart of the onion and destroys its life. As the fly inserts its eggs close to the ground, within the leaf sheaths of the plant, any noxious dressing not injurious to the plant may be used to keep the fly at a distance. Gas-house lime sprinkled between the rows, or thinly over the whole of the seed-bed, will sometimes serve the purpose, and at other times fail. When charcoal is used liberally as a top-dressing, it is very rarely the plants suffer from this pest. Another enemy is the grub of *Eumerus æneus*, the brassy onion fly. This grub is brownish and bristly; it is only in a wet season this is to be feared—drought is death to them. Gas-house lime is the preventive of this also. Deep trenching and a clean state of the ground will be the best preventives of the vermin that destroy the onion crop.

Weather Hints for Farmers.

The following are extracts from Admiral Fitzroy's "Manual of Practical Meteorology." They were intended for the climate of England, but are also of interest here, as telling the signs of the weather:—

"Whether clear or cloudy, a rosy sky at sunset presages fine weather; a sickly-looking, greenish hue, wind and rain; a dark (or Indian) red, rain; a red sky in the morning, bad weather or much wind (perhaps rain); a gray sky in the morning, fine weather; a high dawn, wind; a low dawn, fair weather.

"Soft-looking or delicate clouds foretell fine weather, with moderate or light breezes; hard-edged oily-looking clouds, wind. A dark, gloomy blue sky is windy, but a bright blue sky indicates fine weather.

"Small inky-looking clouds foretell rain; light scud clouds driving across heavy masses show wind and rain; but if alone, may indicate wind only.

"High upper clouds crossing the sun, moon, or stars, in a direction different from that of the lower clouds, or the wind then felt below, foretell a change of wind toward their direction.

"After fine clear weather, the first signs in the sky of a coming change are usually light streaks, curls, wisps, or mottled patches of white distant clouds, which increase, and are followed by a murky vapor that grows into cloudiness. This appearance, more or less oily or watery, as wind or rain will prevail, is an infallible sign.

"Usually, the higher and more distant such clouds seem to be, the more gradual, but general, the coming change of weather will prove.

"Light, delicate, quiet tints or colors, with soft undefined forms of clouds, indicate and accompany fine weather; but unusual or gaudy hues, with hard, definitely-outlined clouds, foretell rain and probably strong wind.

"Misty clouds forming, or hanging on hights, show wind and rain coming if they remain, increase, or descend. If they rise or disperse the weather will improve or become fine.

"When sea-birds fly out early, moderate wind and fair weather may be expected. When they hang about the land, or over it, sometimes flying inland, expect a strong wind with stormy weather. As many creatures besides birds are affected by the approach of rain or wind, such indications should not be slighted by an observer who wishes to foresee weather, or compare its variations.

"There are other signs of a coming change in the weather known less generally than may be desirable, and therefore worth notice; such as, when birds of long flight—rooks, swallows, or others—hang about home, and fly up and down or low, rain or wind may be expected. Also when animals seek sheltered places, instead of spreading over their usual ranges—when pigs carry straw to their styes—when smoke from chimneys does not ascend readily (or straight upwards during calm)—an unfavorable change is probable.

"Dew is an indication of fine weather, so is fog. Neither of these two formations occur under an overcast sky, or when there is much wind. One sees fog occasionally rolling away, as it were, by wind, but seldom or never formed while it is blowing.

"Remarkable clearness of atmosphere near the horizon—distant objects, such as hills, unusually visible or raised by refraction—and what is called a good 'hearing day' may be mentioned among signs of wet, if not wind, to be expected.

"More than usual twinkling of the stars, indistinctness or apparent multiplication of the moon's horns, haloes, 'wind-dogs,' and the rainbow, are more or less significant of increasing wind, if not approaching rain, with or without wind."

Cost of Fences—Improvements Wanted.

The following interesting extracts are from a communication of Charles R. Smith to the *Country Gentleman*:—

"At the New York Fair, facts were presented as to the amount and cost of fencing, which will astonish every man who has not given that subject much thought. $144,000,000 for the fences of a single State! and this is the cost of construction only, the value of the land they cover not being included in the estimate. Notwithstanding their immense cost, they are a century behind the improvements of the ago. Evidently there is no one thing in which our farmers so sadly err as in building fences. They build temporary fences, which require constant watching and frequent repairs; they build wide wall fences, and cover up from 50 to 60 feet of land to the rod, without thinking that by so doing they materially lessen the size of their fields—they build the rail zig-zag, and are profoundly unconscious that it requires four times as much lumber as a straight board fence, and that it puts three-fourths of a rod of land through its entire course, beyond the reach of the plow and mowing machine! A mile of straight board fence can be built with 13,000 feet of lumber. One mile of zig-zag rail fence will require 52,000 feet, making a difference of 39,000 feet. Taking the estimates of Hon. T. C. Peters, as to the amount of fencing in New York, and allowing one-half of them to be straight board fences, and the other zig-zag rail fences, if we reckon the extra quantity of lumber required for the latter at $4 per thousand, and the land at $40 per acre, the crooked fences will cost $49,000,000 the most! Can New York afford to throw away this value of land and lumber? Can the West, so scantily supplied with fencing materials, afford it?

"In my opinion, for a permanent fence, the whole system of putting posts of wood in the ground, to be thrown out by frost in three or four years, or to decay in eight or ten, is wrong; and I believe that the time will come when farmers will as soon build their houses and barns in this way, as their fences, and when zig-zag in fencing will be considered just as much a mark of wisdom as zig-zag in walking. Substitute straight, upright durable fences for the crooked, leaning, short-lived ones so common all over the country, and what a change would be made in the appearance and value of our farms, and what a saving would be made in materials, time, money and labor! We want fences that are easily and cheaply made; that are straight and cover but little land; that are adapted to our river lands and roadsides, where snow-drifts are troublesome in winter, and that will last in every part, without cost of repairs, at least 50 years.

The New Copper Paint.—J. Nickles, the Paris correspondent of *Silliman's Journal*, states that M. Audry, who has been so successful in electro-plating with copper the cast-iron monumental fountains in the *Place de la Concorde*, makes his new copper paint from the porous copper deposited by the galvanic battery, mixed with a varnish. The solvent of his varnish is the light and refined petroleum, or what we call benzine. The copper is very pure and is easily pulverized, then it is mixed with the benzine varnish, and applied either to iron, brass, plaster, or wood. When this copper is mixed with oils, it acquires a green antique hue.

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Railroad Engineers.

There exists in this country a race of men whose life is a perfect paradox. They pass their existence in a whirl of the wildest excitement and danger, which is, at the same time, to them, but wearisome monotony. They have homes and firesides, and wives and children, yet they are ever wandering to and fro, dashing along by cities, villages, quiet country fields and dark forests, as if they had no resting place. Seen daily by thousands of their fellow beings, they are personally known to but very few. Though holding responsibilities, the very contemplation of which is fearful, they are scarcely thought of by even those who place themselves within their power. Until the present season of war there were none in this country who had the lives of others so utterly in their power. Day by day, though they never see or speak to the procession of travelers which follows unresistingly in their wake, they yet have that procession completely in their power. With the spirit in "Manfred," they can almost say :—"Our hands contain the hearts of men, our footsteps are their grave!" The anomalous beings are they who "run" the railroad trains—the engineers, conductors and brakemen. They have been too long looked upon as the rougher kind of humanity, have been the subjects of severe condemnation and reproach upon the occurrence of every disaster; while their skill, bravery, and presence of mind have scarcely ever found a chronicle. Yet if the records of their noble deeds were all gathered and presented in their true light, it would be found that those rough, weather-worn men are entitled to as high a place and as lofty a fame as has been allotted to any other class who cope with disaster.

Gigantic Vegetables in California.

Cabbages weighing 15 pounds are wonders in the New York market; in San Francisco they are common. Whole fields of cabbage heads weighing 20 pounds each have been grown; and hard, solid heads, with no loose leaves, weighing 53 pounds each, are on record. One cabbage, which did not make a head, grew to be 7 feet wide, throwing out leaves 3½ feet long on each side. In many cases the cabbage has been converted into a perennial, evergreen, tree-like plant, by preventing it from ever going to seed. Several of these are growing in the State, with stalks from 2 to 6 feet high, and a foliage that grows through winter and summer. In 1857, one squash vine on the ranch of James Simmons, in Yuba county, produced 130 squashes, weighing in all 2,604 pounds. In the same year J. Q. A. Ballou, at San Jose, grew 2 squashes weighing 210 and 204 pounds respectively. The largest California onion weighed 47 ounces avoirdupois, and measured 22 inches in circumference. The largest red beet weighed 118 pounds, was 5 feet long and a foot in diameter. It was three years old. The first year it grew to weigh 48 pounds, and because of its large size was reserved for seed; but it disappointed its owner, and, instead of producing seed the next year, merely kept on growing, and reached the size of 86 pounds, and the following year got to 118. Such beets can be grown in abundance. A beet of 20 pounds is a wonder in New York; in California it is too common to attract more than a glance. Beets are frequently 3 feet long, so that it requires no little trouble to dig them out. —*California Farmer.*

Interesting to Boiler-makers.

According to the experiments made by Professor Fairbairn, the law of resistance for cylindrical tubes is this: A tube having the same strength of material, and being of the same diameter, will resist double the pressure to one of double the length; or the collapsing pressure, other things being the same, varies inversely as their lengths, and inversely as their diameters. Experiments made with elliptical tubes showed that in every construction where tubes have to sustain a uniform external pressure, the cylindrical is the only form to be relied upon, and that any departure from the true circle is attended with danger. The experiments also tend to confirm the conclusions heretofore arrived at, namely, that the strength of riveted joints of malleable iron plates are nearly as the numbers, one hundred for the plate, seventy for double-riveted joints, and fifty for single-riveted joints.

Kerosene Lamp-chimneys.

Mrs. Mary Kyle Dallas thus comments (in the *New York Weekly*) upon the domestic bliss which has attended the introduction of kerosene-oil lamps into her family :—

"Who, in the name of everything smashable, invented them? Did the old gentleman in black, with suspicious feet, visit this earth in the guise of an oil merchant, and bestow upon miserable mortals those abominable long-necked chimneys? Or did he only prompt the fiendish thought which gave rise to them by evil whispers in the left ear of the misguided inventor? One would think so, for, of themselves, kerosene lamp-chimneys are sufficient to fill the lunatic asylums with wretched housekeepers and drive young couples, trying to keep house on nothing, to commit suicide. *You* could tell all about them, could you not, Mrs. Saveall? who—dear little economical soul that you are—finding the gas a heavy item, resolved, once upon a time, to save your spouse's pocket by using kerosene oil. Accordingly, you purchased several lamps at auction for a mere nothing, bought three gallons of oil from a good-natured cousin in the trade, at wholesale price, and then said to your husband: 'Now, love, we'll have no more of that dreadful gas bill.' Saveall, of course, was pleased; but during the course of the evening you made the discovery that there was an odor which was far from delightful, somewhere or other. After Mr. Saveall had rummaged the house, inspected the cellar, and rapped at the surbase for dead rats, you mustered up courage to suggest, faintly, that you were 'afraid it was the oil.' Of course it was; no doubt of that, but you can agree that you will get used to it after a while, if you are not suffocated at first. 'Besides,' says Mr. Saveall, 'no doubt the lamp is wrong, somehow; let me see. Oh, yes, I'll screw it a little tighter, and I'm sure the smell will cease to be perceived!' Accordingly, Mr. Saveall gives the required screw to the lamp top, and as he does so, dash, crash, smash, goes the chimney in a thousand pieces over the hearth!

"'Phew!' whistles Saveall, 'how very singular;' and you echo the remark. Fortunately, you have another lamp, and after many astonishing accidents, such as getting the wick all out at the top, or screwing it all down into the oil, or trying to light the brass tube, and dropping the match through the aperture, at the risk of an explosion, your second lamp is fixed to suit you. It will smell badly, but you are so glad to get the light by this time, that you don't notice it. 'It is strange you should have been so careless as to break that chimney!' you say in a pettish tone, to your 'lord and master,' as you reach a glass of water from the table; now I could use one a year and never crack it, my dear.' But even as you speak, whiz, fiz, goes the second chimney into more minute particles than the first! You are inclined to think the days of witchcraft have returned, until you discover that the secret of the explosion is the drop of cold water which, trinkling down the side of the goblet, fell upon the heated glass.

"'Use it a year, could you, Kitty?' says Mr. Saveall with a provoking laugh, as you pick up the pieces, and you begin to feel indignant, when squalls from the nursery call you thither in alarm. Bobby, in his night-gown, is standing on a chair near the bureau, looking guilty; and Sammy explains from his crib that 'Buzzer Bob wath thquirtin water at me from the wath bathin and thmathed the lamp,' which Bob denies, vowing that he never touched the chimney, and guesses Sam 'fired something at it.' Whereupon Mr. Saveall delivers an oration on the expansion of glass by heat, while you chastise Bobby, and run a bit of glass through your slipper into your foot. You have still one chimney left, and as you retire, you place this last treasure upon the lamp you intend to burn all night. 'Turn it down a little, my dear,' you say to Mr. Saveall, as you cuddle up the baby; and Saveall does it with a flourish, thereby putting it out altogether. 'No matter about lighting it again,' you say, 'you'd be sure to break it in the dark,' and in a very cross mood you address yourself to sleep.

"About midnight, baby bethinks himself of the colic, as an interesting means of passing the time, and cries, and squeals, and kicks as only a baby can. Catnip tea must be had, and sleep. Mr. Saveall arises to light the lamp. Sooner said than done. He cannot get that chimney off. He tugs and pokes. 'How do you do it, love?' 'To the right—I mean to the left—somehow or other; I know you screw it round!' is your lucid answer. 'Please hurry!' 'I should think it was nailed on,' mutters Saveall. 'Ah, now I have it—no—ah this is it.' Smash!—it is all over with that last chimney. You groan; Saveall says something naughty, and tries to pretend he only coughed, and baby's voice [illegible] octave higher. 'Perhaps it will burn without the [illegible]' says Saveall. Ah! I thought so—there!' [illegible] even as he speaks, the unshielded flame pops up and goes off with a blue explosion which makes you shriek in terror, and might be dangerous but for a sudden *douche* of cold water. So, despairing of your kerosene-oil lamp, you light the gas and use it ever after; consigning the new purchase to oblivion, and compassionating your unhappy neighbors who, having no gas, must continue the ruinous smashing process indefinitely."

The Seasons of California.

Nowhere in all the earth are the phenomena of day and night ushered in with such splendor as in this valley that lies so closely on the confines of the occidental sea. Nowhere does the beautiful sun—manifest type of God—so drape himself in bannered clouds, so grandly fit to be the couch of all magnificence, as he does in this, our Palestine. A poet and a dreamer would say that when the sun so clothed himself in such array of billowy beauty, it was a grand prayer and a benediction, a terrestrial adoration swelling from nature's heart to nature's God. May the sunset of Time be as gorgeously painted and as auspicious of hope! The seasons of California are varied and lovely. In this valley, during the warm days of summer, our eyes rest on the snow-capped hills that surround us at the North, while the ocean breezes from the South fan us unto pleasantness. During our warmest months night comes to our relief, cold and exhilarating. Then we are favored by the delightful season of autumn. Could more be asked on earth, so far as weather is concerned, than has been presented the past few weeks? The husbandman has been enabled to harvest his golden crops, while the miner has been allowed to delve in the sands of the rivers for hidden treasures, unmolested by early rains. Soon we will reach the season of winter, when the heavens will commence their weeping, interspersed by clear skies and bright sunshine. We pass through the season of rain and of sunshine, to be conducted into the season of spring, when the lilies will spring from the mountain side, the floods be withdrawn, and the plain covered with flowers. Verily, we dwell in pleasant places, and while peace is by our firesides, we are furnished with plenty, and should consider ourselves the most happy and prosperous people on the face of the earth.—*Marysville Appeal.*

An Exhumed City.

A most singular discovery has been made on the French coast, near the mouth of the Garonne. A town has been discovered buried in the sand, and a church has already been extracted from it. Its original plan shows it to have been built near the close of the Roman Empire, but changes made in it had given it the appearance of an edifice of mixed style, in which Gothic architecture has usurped the place of the Roman. The original paintings, its admirable sculptured choir and Roman capitals are adorned with profuse ornaments, which are attracting a number of visitors. This temple is all that remains of those cities described by Pliny and Strabo; the Gulf of Gascony abounds in ruins of those ancient cities. It has been 1,500 years since Novigamus, the old capitol of Medoc, which was a very celebrated city when the Romans were masters of Gaul, was buried under the ocean; of all that tract of territory the Roche du Cordonon alone is visible. The remains of Roman roads, the site of Jupiter's temple, the vestiges of the Spanish Moors and the roads to Eleanor de Guyenne have been rescued from the sands in the neighborhood of the long-buried city of Soulac. Nowhere has the erosion of the ocean been greater than on the coast of Gascony.

LUNCHEON, says Thackeray, is base ingratitude to breakfast and premeditated insult to dinner.

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The Ericsson Batteries in Action.

Some very interesting details of the late performances of the new iron-clads are here appended, quoted from the letter of a correspondent of an Albany paper. The writer relates one extraordinary result of firing the heavy guns, which seems, to say the least, singular. Why firing a heavy gun over a ship's quarter should cause the boiler foam is not very clear :—

"On Sunday morning we went to it again; the *Montauk* got her position, and we all hammered away for three hours; several guns were dismounted; the enemy were again and again swept from them; but they supplied their places and kept up an unremitting fire. The rents made in the loose sand, of which the fort was constructed, were repaired; the enemy fighting with the greatest determination and pluck. We were obliged to give it up as a bad job. The *Montauk* was struck forty times in this affair by rifle bolts and eight 10-inch solid shot, but came out with no material injury! My nice little cabin was knocked into a cocked hat.

"The interesting part of this adventure is the performance of the *Montauk*—she being one of the new class of *Monitors*, and this being the first time any of them have been subjected to the severe test of actual service. You will be interested, I know, in hearing of the powers of iron. She is a great curiosity. The shot struck her in every part necessary to fully prove her invulnerability. On her flat deck, protected by 1-inch plates, over 8 inches of oak, and beams 12 by 12 inches, 23 inches apart, she received five or six shots; they made furrows, but glanced, doing no injury; her side armor (5 inches) was struck repeatedly, making dents about 1 inch deep, covering a segment of one-fourth the circumference of the shot, which were smashed by the impact.

"Upon her turret (11 inches) similar dents were made, but not so deep; the same effect was produced upon the pilot-house on top of the turret (6-inch iron). No visible effect whatever is discernible inside, except in the pilot-house, where seven of the bolt heads, which there secure the plating, were thrown violently through and inside by the impact. The people there were obliged to take refuge outside under the lea of the turret. In no place was there the least sign of penetration. The enormous 15-inch gun, weighing with its carriage 45,000 pounds, was handled with ease. No trouble or annoyance was experienced from the concussion or smoke either from the impact of shot outside or from the discharge of the gun.

"When a shot struck the turret it sounded like the cracking of a nut upon an anvil. Many difficulties were experienced, but all admit of a remedy; but it is a marvel how such complicated machinery worked upon its first trial. The turret, weighing 150 tuns, is, as you know, keyed up from below, and its weight supported upon a shaft; after continued firing it sagged somewhat and considerable trouble was encountered in keying up, so that it would revolve easily. The blast from the guns came back through the eye-holes in the pilot-house so that effects of practice could not be observed. The big gun fills up its port-hole so that it could not be sighted, except by the '11-inch' alongside of it, which is rough gunnery.

"Firing over the stern and quarter caused the boilers to foam; they must be secured also more firmly; down 'below' glass suffered and the wicks of lamps disappeared at each discharge. Some means must be devised for handling the enormous projectiles, weighing upwards of 400 pounds.

"On the whole these novel crafts are a success—so far as fighting qualities are concerned; but I would rather go into ten actions than to make a passage at sea in one of them. It is God's providence that enables them to 'march' upon the ocean. If they live through one gale they never will survive another. In smooth water they seem to be perfect, but our people must not expect too much of these vessels.

"I would guarantee to hold a sand battery like that at Genesis Point againt a dozen of them; two of them would demolish Fort Sumter or any square casemated stone or brick fort in two hours; but sand forts are a different thing, particularly where the guns are isolated and far apart, protected by high, thick earthen 'traverses.' The shell bury in the sand and throw it about promiscuously; but, unless you hit the gun itself, no great damage is done, beyond occasionally killing a gun's crew whose place can be be supplied if its defenders are in earnest."

ANCIENT AND MODERN WEAPONS OF WAR.

It has been aptly remarked that there is nothing new under the sun. No sooner does some special exigency call for destructive instruments of war, or for machines calculated to expedite more peaceful pursuits, than, undaunted by difficulties, the inventors spring forth fully equipped for all emergencies, each bearing some novel machine to accomplish the end in view. When iron-clad ships were suggested, the proposition was first derided by the universal Yankee nation, then barely tolerated, and finally adopted with the utmost enthusiasm. Rams were advocated, discussed, *pro* and *con*, as to their merits, until they too were considered indispensable, and were also put in hand. Long centuries before the *Merrimac* bore down upon the helpless *Cumberland*, and smashed in her sides with her iron beak, the Romans and Greeks had armed the prows of their vessels

Fig. 1

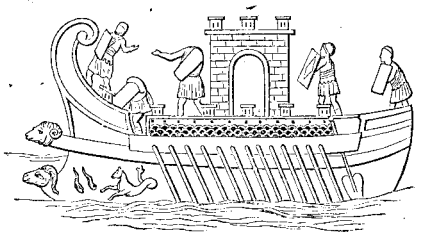
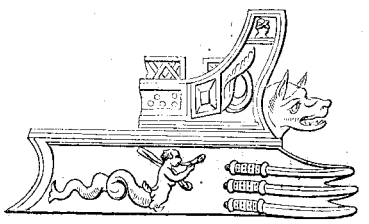


Fig. 2



with short arms, which, propelled by the lusty arms of a hundred or more slaves (who were condemned to the galleys or triremes, as punishment for their crimes), ran in to the ships of their enemies with great speed and force, and sent them to the bottom. These "ships" of war were only used on rare occasions, as they were heavy and hard to manage. Their thickness of hull was as great as that of an ordinary steamboat of modern times. We append two views of the different sorts of rams and vessels to which they were attached. The first is a vessel propelled with fifty oars, twenty on a side; she was in use in the year 700 B.C., and is supposed to have been invented by a Corinthian called Ameinocles. The position of the rams, and the literal representation of the animal's head in one of them, shows that the ancients had a realizing sense of the force which the patriarchs of the flock were capable of exerting.

Other rams were afterwards adopted of which an illustration is also given. The tower seen amidships of the ram is a structure intended as a shelter for the "chivalry" of the period, the headless individuals on deck are supposed to have lost their caputs by the skill of some sharp-shooter. They are apparently not at all incommoded but continue their orders without removing from the scene. The prow was generally ornamented with some enigmatical figures, either painted or inlaid; and it was not uncommon to add a representation of a human eye upon each side of the bow. Just below the prow, and projecting a little above the keel, was the *rostrum* or beak, which consisted of wood, armed with sharp pointed iron, or the head of a ram. The use of this attachment is obvious. These rams are said to be the invention of Piseus of Tyre; at first they were set above water, and were plainly visible, but afterwards it was deemed more politic to place them below the surface, and then the moral and physical effect produced upon an adversary was much augmented. The ram was also used independently, in land assaults on fortified cities, and was mounted for this purpose on a beam; worked by gangs of huge Greeks, they smote the walls such sturdy blows that the blocks of stone soon tumbled in. The assailants then stormed the breach as in modern warfare.

So also with the iron-clad turrets and towers now in use, their origin is very ancient. Diodorus (B.C. 405) mentions this kind of defence as being used by Dyonisus, at the siege of Motya. These towers were built of huge timbers, and were armed on their fighting sides with heavy iron, to protect them from the assaults of the enemy, they were also covered with raw hides and blankets, moistened with a solution of alum, to prevent them from being fired by the enemy. When about to go into action, the towers were pushed close to the walls of the besieged city, and the warriors inside then did their best with the limited means they possessed. Battering rams were brought to bear upon the masonry, and firebrands were also thrown within the walls, while the assailed in their turn employed similar means for beating off their opponents. These towers were considered very formidable machines. At the siege of Rhodes, Demetrius Poliorcetes employed an iron-clad turret called a "hele polis." Its form was pyramidal, and the three sides exposed were covered with iron plates. Towers of this description were used to destroy the walls of Jerusalem when it was taken by the Romans.

Still another device, lately resuscitated, belongs to the ancients—that of the shield to cover infantry in the field moving to attack other infantry or walled cities. The ancient shield was a very crude affair, but it sufficed as a protection against the weapons of the period. It was called a *testudo* or tortoise, from its resemblance to the shell of that reptile, and seems to have been very useful.

The foregoing are only some of the ancient weapons of offense and defense that were employed centuries ago. Fashions change; the world moves, it is said; and yet we come round, in cycles of time, to adopt those methods which the barbarians of old invented. Aided by the discoveries of science, we so improve upon their crude ideas, that we shall shortly reduce the art of war to a fruitless struggle—one wherein neither side can obtain a decided advantage. This is the present tendency of things, and in the words of the poet, it is "a consummation most devoutly to be wished."

Birds' Sense of Danger.

The power of judging of actual danger, and the free and easy boldness which results from it, are by no means uncommon. Many birds seem to have a most correct notion of a gun's range, and, while scrupulously careful to keep beyond it, confine their care to this caution, though the most obvious resource would be to fly right away out of sight and hearing which they do not choose to do. And they sometimes appear to make even an ostentatious use of their power, fairly putting their wit and cleverness in antogonism to that of man, for the benefit of their fellows. I lately read an account, by a naturalist in Brazil, of an expedition he made to one of the islands of the Amazon to shoot spoon-bills, ibises, and other of the magnificent grallatorial birds, which were most abundant there. His design was completely baffled, however, by a wretched little sand-piper that preceded him, continually uttering his tell-tale cry, which aroused all the birds within hearing. Throughout the day did this individual continue its self-imposed duty of sentinel of others, effectually preventing the approach of the fowler to the game, and yet managing to keep out of the range of his gun.—*Gosse's Romance of Natural History.*

ORIGIN OF THE TERM "HUMBUG."—This now common expression is a corruption of the word "Hamburgh," and originated in the following manner :—During a period when war prevailed on the Continent, so many false reports and lying bulletins were fabricated at Hamburgh, that at length, when any one would signify his disbelief of a statement, he would say: "You had that from Hamburgh;" and thus "That is Hamburgh," or humbug, became a common expression of incredulity.

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VALUABLE RECEIPTS.

PYROPHORUS—"GREEK FIRE."—Much has appeared lately in several of our papers respecting incendiary shells and unextinguishable combustible fluids, which are likened to the ancient "Greek fire," and claimed as re-discoveries of that famous pyrophorus with which the Athenian sailors terrified their enemies. It seems not to be very generally known that there are several substances and mixtures which take fire spontaneously when exposed to the air. "Homberg's pyrophorus" possesses this property and is prepared as follows :—Take equal parts of alum and coarse brown sugar and mix them together in an iron ladle, held above a fire until the mixture melts, swells and runs into small dryish lumps. It should be stirred during the period of melting with an iron rod. The fused lumps are next reduced to powder in a mortar, and again roasted until all the moisture is perfectly expelled, in which condition it looks like charcoal powder. While hot it is next placed in a phial, which must not be more than three-fourths filled, and in the neck of the phial a long narrow tube must be closely luted. The phial, with its contents, is now placed in a crucible, which is covered with sand, and placed in a fire, leaving the small tube projecting some distance out. When heated to redness a thick smoke first issues through the tube from the contents of the phial, for about fifteen minutes, and this is succeeded by a sulphurous vapor, which must be inflamed and allowed to burn as long as it issues. The tube is now to be closed with a plug of soft clay and the crucible removed from the fire. When the phial becomes cool the contents must be hastily transferred to another dry and warm strong glass phial, of the same size, and fitted with a ground-glass stopper. The powder thus prepared is the pyrophorus ; a little of which, when thrown upon a flat surface and exposed to the air, bursts into flame. Another mixture, called "Gay Lussac's pyrophorus," is made by calcining 16 parts of lamp-black with 27 parts, by weight, of sulphate of potash, in a crucible. It forms a shower of sparks when thrown into the air. A pyrophorous powder may be mixed with an inflammable liquid devoid of water and oxygen, which, when ejected into the atmosphere, will take fire spontaneously ; thus, when mixed with naphtha or benzole, it will form a fluid for incendiary shells. It is also stated on page 25, Vol. VI, (new series) of the SCIENTIFIC AMERICAN, that Disney's incendiary shell is filled with naphtha mixed with phosphorus, and that, when it bursts, the fluid ignites and burns in the air. Phosphorus inflames spontaneously in the atmosphere. It is soluble in naphtha and bi-sulphide of carbon, which dissolves about one-fourth of its weight, and is well adapted for use as an incendiary fluid for war purposes.

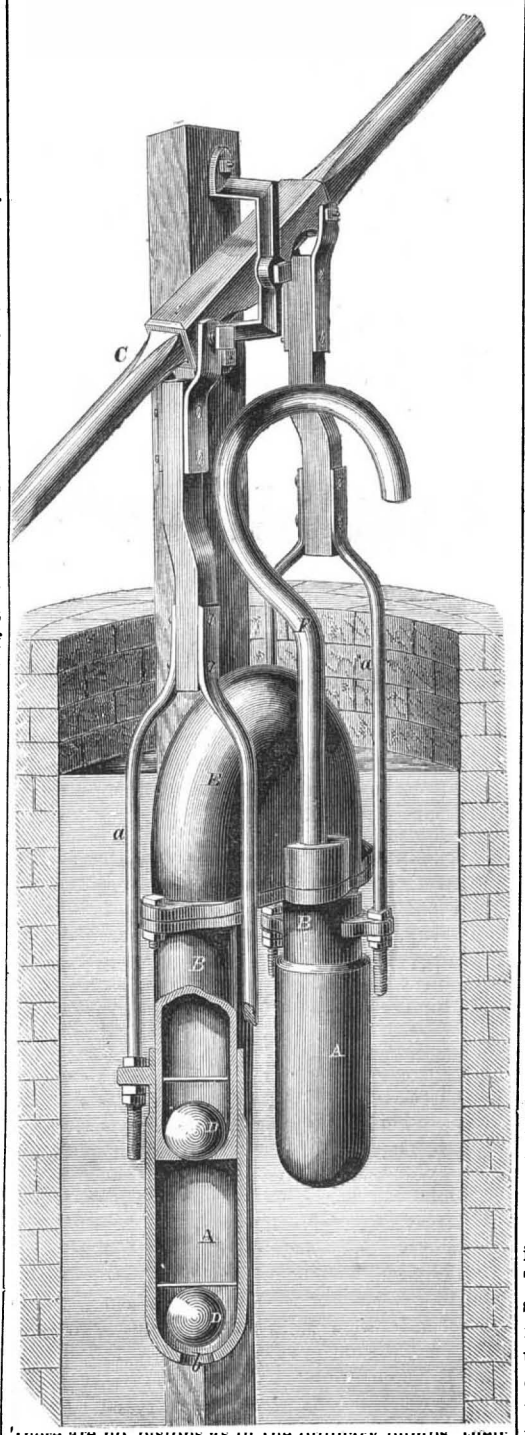
TANNING SKINS WITH THE WOOL OR HAIR ON.—First wash the skin in strong soap-suds, to remove the grease and dirt from the wool, then rinse in clean cold water. The skin should now be tacked upon a board (with the flesh side out) and stretched, its edges trimmed, and the whole fleshy part scraped off with a blunt knife. It is now rubbed over hard with as much chalk as it will absorb, or until the chalk falls down in powder. Now take the skin down, fill it with finely ground alum, wrap it closely together, and keep it in a dry place for two or three days ; at the end of that time unfold it, shake out the alum, and it will be ready for use, after being again stretched and dried in the air. This method is for white sheep-skins for door-mats. Another mode of treating them consists in applying a strong solution of alum, moderately warm, with a sponge, to the flesh side of the skin, when it is stretched, then allowing it to dry, before the chalk is rubbed in. It must always be dried in the open air, or it will turn very hard. Another mode of tanning skins with the hair on, after they are stretched on the frame and scraped, is to apply a warm decoction of sumac, prepared by boiling one pound of sumac in a gallon of water for about five minutes. The sumac liquor is applied with a sponge to the whole fleshy surface, then the skin is dried in the open air. Three applications of the sumac are given, and when the skin is dried it is laid upon a smooth board or table, and rubbed down with pumice stone. Both alum and sumac combine with the gelatine of the skin, and form leather.

HATCHING FISH.—The Chinese practice a peculiar method of hatching the spawn of fish, which perhaps may be useful for our fish cultivators to know. They carefully collect the spawn of fish in their streams and rivers, fill empty shells of fresh eggs with it, carefully stop up the holes in the eggs and set them under a setting hen. At the expiration of nine days they take these shells and break them in tanks containing water warmed by the sun. The water in these tanks is frequently renewed, and in it the young fry are gradually developed until they are sufficiently large to be placed in fish-ponds. The sale of fish spawn for hatching forms an important branch of trade in China.

HARDENING WOOD FOR PULLEYS.—After a wooden pulley is turned and rubbed smooth, boil it for about eight minutes in olive oil, then allow it to dry, after which it will ultimately become almost as hard as copper.

MORRELL'S PATENT PUMP.

The machine herewith illustrated is a force pump, with a peculiar arrangement of its working parts.



There are no pistons as in the ordinary pumps, their places being supplied by the external cylinders. A brief description of the invention will make it intelligible. A A are two barrels, turned true outwardly, to which are fitted the cylinders, B B. These cylinders have lugs on either side, to which rods are attached, connecting overhead with the handle or brake, C. The ball valves, D, seen in the section of one of the pumps, are seated at the bottom of the cylinder and barrels, and are prevented from rising too far from their places by the small iron rods. The air chamber, E, communicates with the upper end of the barrels, and water is forced through the eduction pipe, F, into a pail placed beneath it. The operation of this pump is very simple. It is immersed in a well or cistern, as shown in our engraving, and by working the brakes the cylinders ascend and descend, the water flowing into them through the passage, *b*, opened by the rising of the ball valve. When the barrel rises, the lower ball closes and the upper one opens the passage into the air chamber, through which the fluid enters into the pipe. This pump, by the arrangement of two cylinders and barrels, has an uninterrupted discharge, as one fills the other empties, *ad infinitum*. When not in use, the water remaining in the chambers immediately after pumping finds its way out into the well again, and is consequently uncontaminated by any action of the metal upon it, and is also prevented from freezing for the same reason. This pump is said to force water to a great distance ; it is made of either wood or metal, as parties desire.

The patent for this invention was procured, through the Scientific American Patent Agency, on January 7, 1862, by James A. Morrell ; further information can be had by addressing Morrell & Borgion, at Richmond, Ind.

Power and Office of the Press.

A writer in the *Family Herald* (London) says :—"Mr. Kinglake, the historian of the Crimean war, an observant statesman and member of Parliament, gives it as his conviction that the *Times* newspaper alone caused that war ; if so, it has made bankrupt one empire, caused the death of the greatest Emperor of the age, established another on his throne, broken the power of the nobles in Russia, freed the serfs, rendered thousands of women husbandless and childless, killed more than one general, made or ruined the reputation of others, and made hundreds of our best families mourners. It had first fed public opinion, impressed it with an idea, and then by constant iteration rendered this idea a reality. But during this very time a country squire, master of hounds, ordered his huntsman to warn off one of its editors as a person with whom he would not associate ; and the editor of the *Times* having written a warm and friendly letter to Sir Charles Napier, begging him not to peril his great name by delay, but to take Cronstadt or Helsingfors, the club gossips and critics, nay, and some writers as well, take him to task and say : 'What insolence ! a mere newspaper editor to attempt to dictate to a British admiral !' The true editor's position has not been altered from from the time of Defoe. 'If,' writes that acute and honest observer of the world, 'I might give a short hint to an impartial writer, it would be to tell him his fate. If he resolves to venture on the dangerous precipice of telling unbiassed truth, let him proclaim war with mankind, and neither give nor take quarter. If he tells of the crimes of great men, they fall upon him with the iron hands of the law ; if he tells of their virtues, when they have any, the mob attacks him with slander. But if he regards truth, then let him expect martyrdom on both sides, and then he may go on fearless ; and this is the course I take myself.' This course by the way, rendered the life of Defoe of infinite value to the nation, perhaps of much more value than that of any great lord or minister of his time."

Migration of Eels.

A close observer states that the following interesting evolutions occur when eels come in from the sea. The aggregate shoal, about to ascend the inland streams, moves up the shore of the river, in the form of a long, dark, rope-like body, in shape not unlike an enormous specimen of the animal which composes it. On reaching the first tributary, a portion, consisting of the number of eels adequate for peopling this stream, detach themelves from the main body, and pass up ; and in the subsequent onward passage of the shoal, this marvelous system of detaching, on reaching the mouths of brooks, a proportionate quantity of the great advancing swarm, is repeated, until the entire number has been suitably provided with rivulets to revel in—such being the wonderful instinct by which nature ordains that each stream shall be provided with a competent number of these migratory creatures.

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Correspondence

The Distillery Business---Distillation.

[Concluded from page 198.]

By means of the three processes already explained in the former articles, viz., malting, saccharification and fermentation, the formation of alcohol (whisky) is obtained in the beer; and now the only process remaining is to free the alcohol from all foreign matter with which it is associated. This constitutes the last part of the distilling process, and is, strictly speaking, the distillation. The fermented beer is a liquid composed of diluted alcohol, water, one or more volatile oily liqulds, gas and various solid undissolved substances. The separation of the alcohol from them is effected by means of evaporation—a very easy process, for the reason that alcohol evaporates in a temperature of 176° Fah., while water requires a temperature of 212° Fah.

Every fermented liquid, when distilled in a close vessel—a still—so that the vapors can rise and be conducted by a pipe into a cooled receiver—a worm—condenses into a liquid state, which is an ardent fluid, generally called whisky. Its radical is called alcohol. Alcohol obtained by simple re-distillation has a specific gravity at 60° Fah., of 825, and is therefore considerably lighter than water, which is 1,000. The purest alcohol obtained by rectification has a specific gravity of 791—usually however, 820. Alcohol is never produced except by the vinous or alcoholic fermentation of particular substances, and after the completion of such action, distillation of the fermented body affords it either in a concentrated or in a diluted state. By mere distillation, however long-continued or often-repeated, neither pure nor absolute alcohol—free from water—can be made; because alcohol has a great affinity for water, and the distillation is insufficient to overcome this affinity.

To procure absolute alcohol, the best adopted way is the use of quick-lime. It is reduced to coarse powder and put into a vessel with the alcohol, the whole mixed by agitation and left for several days. During this period the water unites with the desiccating body, leaving the spirit anhydrous, which may then be distilled by the heat of a water-bath. The quantity of the quick-lime used should never exceed three times the weight of the alcohol. Pure anhydrous or absolute alcohol is a limpid, colorless liquid of a greater fluidity than water, having a penetrating agreeable odor and a hot pungent taste, owing to its avidity of abstracting water from the tissue of the tongue. Alcohol requires an intense cold to effect its freezing, and, when of the specific gravity of 0.798, it becomes oily at 130°; it flows like wax at 146°; it thickens, but does not congeal, at 166° Fah. below zero.

As to the mode of running a still, the steam should not be introduced too rapidly into the beer, which is contained in the still, during the distillation, but a greater part of the water should evaporate simultaneously with the whisky and both passing through the worm, should make a whisky of lower proof. Besides, by forcing the steam too rapidly into the still and thus creating too high a temperature, a portion of the alcohol is transformed into gas and vapors, and escapes from being condensed in the worm, at the same time that a large portion of the volatile oil (essential oil) is caused to evaporate and is found contained in the whisky. By the distillation of fermented liquids the whisky, which passes over, contains always a small but variable proportion of one or more volatile oily liquids which mix with the whisky and give it a peculiar flavor. These volatile oils says a celebrated chemist, vary in kind, in composition and in sensible proportions with the kind of sugars which have been submitted to fermentation and with the substances which are present together with the wort. Hence, the whisky obtained from almost every different kind of fermented liquid is distinguished by its own characteristic flavor. Thus wine, when distilled, is called brandy or cognac; fermented molasses yield rum; Indian corn, rye and potatoes yield liquors which are distinguished as corn, rye and potato whisky; while malt liquors (from barley) yield Scotch and Irish whiskies. If juniper berries are added to the liquor previous to distillation, as is done in Holland, or anise, as in Poland, the flavor is imparted to the spirits, which is called gin and wudka; and if the malt is dried over a peat (turf) fire, the spirits assumes the flavor and taste of the peat.

The volatile oil of Indian corn, wheat or rye, &c., is neither of an agreeable flavor nor healthy. The faster the still has been run, the more of this volatile oil will be present in the whisky, and the quality of the whisky is then inferior. All volatile oils of any amylaceous substance, generally called amyle alcohol or fusel oil, appear to be identical with the same of the cognac distilled in the south of France from the grape husks, and it is, therefore, to be presumed that the contamination must, in all cases, lie in the skin or epidermis. These volatile oils, not the alcohol itself, are the principal causes of the *delirium tremens;* and it is therefore an essential requisite for making a pure, good and healthy whisky and gaining as much as possible from the beer, that the still is not run too fast and that the worm is kept sufficiently cool, so as to make the whisky run at a temperature of from 60° to 65° Fah.

The condenser used in all distilleries is the worm. It is almost impossible to clean it mechanically and thoroughly, which should be done frequently to remove the adhering essential oil and oxidized copper (verdigris). A condenser constructed of vertical pipes would be much better in almost every respect, and this kind is in use in the best distilleries of the old country. Such a condenser can be cleaned at any time and is much cheaper than a worm.

I will not lengthen this article by adding other minute details. My purpose has been to recount a few striking deficiencies in the present system, to indicate the surest means of essential reform, and to trace out a clear way for improving the quantity and quality of the whisky, when I compared the old system with the more perfect new one. I have made frequent reference in my articles to the opinions and explanations of the most eminent chemists, in order to prove that my own experience is upheld by them and that it is in strict harmony with scientific principles.

The judicious distiller who contrasts the processes described in the foregoing paragraphs with his own method will readily perceive their great superiority. They occasion less expense and promise greater returns. For both reasons he ought to favor their adoption. It will certainly not be unprofitable to the distiller to examine the statements I have made in the foregoing articles, when he will find every one of them an irrefutable truth. I wish nothing more than that every distiller would try what I have said and judge for himself.

The state of the business at the present time urges the introduction of some improvements. A distillery managed on the old plan cannot yield the profits that it did in former times, because it is burdened with the increase in the price of grain, a corresponding reduction in the value of whisky and with the additional heavy tax of a high duty. We may wait for a change in affairs, a general restoration of credit and the impetus imparted to trade by renewed commercial activity. But these circumstances will hardly avail to render distilling as lucrative as it was several years ago. The true remedy lies in an abandonment of old methods with their useless waste of time, material and money, and the substitution of a system founded on scientific principles, whose perfectness, cheapness, profitableness and simplicity must win for it the support of every intelligent distiller. There never was a time when new and useful improvements were more needed in the art of distilling, and the old processes have ceased to repay the capitalist who invests his money in this business.

The writer is willing to prove beyond the possibility of a doubt all that he has said in his articles; his aim being to make himself useful to distillers and to contribute some valuable and important improvements to the distilling business.

L. Smith.

15 North Main street, St. Louis, Mo.

A Californian Tree 6,300 Years Old!

Messrs. Editors:—On page 20, current volume of the Scientific American there was published a paragraph entitled "Great Ages of Trees," in which you quote a Mr. Denton as authority for saying that one of our Californian trees was 2,496 years old. I presume he had reference to one of the group of trees known as the "Mammoth Tree Grove," situated in Calaveras county in this State; but I think he committed an error in his calculation. I herewith inclose you a small block of wood, cut from one of those trees, to enable you to make your own calculation. The tree of which that block once formed a part was rather more than thirty feet in diameter; but, for convenience of reckoning, I estimate the diameter at precisely 30 feet; and I have counted 35 rings to the inch. Now by multiplying the rings per inch by half the diameter, I ascertain the age of that tree to have been 6,300 years. This leaves the saplings of our ancient friends, Nebuchadnezzar and Socrates, standing "out in the cold," and carries our mind back to a period long before Eve ate stolen fruit from an apple-tree and Adam instituted the tailor's trade by stitching fig-leaves into aprons for "self and spouse." The inclosed specimen block is *genuine.* R. R. Haines.

Placerville, Cal., Feb. 28, 1863.

[The piece of wood sent us by our humorous correspondent is a beautiful specimen, resembling mahogany, but much lighter in weight. The annual rings are clearly marked. Think of a tree measuring rather more than thirty feet in diameter! California is certainly a "big" State.—Eds.

Experience with Friction Gearing.

Messrs. Editors.—Noticing a letter on page 167, current volume of the Scientific American, in relation to smooth-faced frictional gearing, the thought occurred to me to give you what information I possess in regard to them. In a steam sawmill in which I was employed was a circular saw, about twenty-five inches in diameter, used for cutting up slabs and other waste from the logs into wood and lengths for lath. The shaft from which it received its motion was driven by a set of bevel friction wheels. They were about two feet in their largest diameter, and had a face of about eight inches. They were made of pine and turned smooth.

Although we were frequently troubled by the belts slipping or running off (there were two between the saw and bevel wheels), the friction wheels always held. The saw was thrown in and out of motion by means of a lever, thus bringing the wheels into close contact or leaving them apart as we pleased. They had the following advantages over toothed gearing:—Their first cost was less; they run smoother and stiller; they were more easily thrown in and out of gear. The machinist who put them in says if he were to build a grist mill for his own use, he would use smooth-faced cast-iron frictional gearing in preference to toothed wheels.

H. Holcomb.

Andover, Ohio, March 26, 1863.

Analogy.

We often find great difficulty in trying to make people understand what analogy is, and yet in its simplest form there is scarcely anything more easy of comprehension or more frequently used. Analogy is the resemblance or comparison which exists between two or more persons or qualities or things. The common and every-day forms of speech abound in analogies, which are so well-known and trite that it seems almost ridiculous to quote them, and yet it is necessary to do so in order to be properly understood. When we say a boy is like his father, we discover and indicate points of analogy. They are analogies when we say of a thing that it is as green as grass, or as white as snow, or as pure as faith, or as true as steel, or as precious as gold. In fact, these simple forms of analogy are so common in the language, that we can scarcely open our mouth without one dropping out, for comparison is one of the most active faculties of the human mind, beginning its operations at a very early age—long before the child can speak, and continuing without the least diminution of vigor down to the latest period.

Perfumes.—So perfect were the Egyptians in the manufacture of perfumes that some of their ancient ointment, preserved in an alabaster vase in the Museum at Alnwick (England), stills retains a very powerful odor, though it must be between 2,000 and 3,000 years old.

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Nickel.

The following very interesting and useful information, respecting the metal *nickel*, was communicated by Mr. Lewis Thompson, M. R. C. S., to *Newton's London Journal of Arts*:—

"There is every reason to suppose that metallic nickel is an alloy of that metal with cobalt, in greater or smaller proportion—that, in fact, absolutely pure nickel has not hitherto been obtained. Pure nickel is, however, much more easily made than pure cobalt, for its affinity for oxygen is much less. Taking advantage of this fact, I made up a quantity of pure oxide of nickel into a paste by means of a little water, and forced this paste through a perforated earthenware plate, so as to form it into a granulated mass; when this mass had been thoroughly dried, I introduced it into a porcelain tube, and, after heating it red-hot, I passed a current of pure hydrogen gas over it, and continued this until it had become cold. The grey metallic sponge thus produced was fused with a little borax, in a crucible, lined with pure alumina, and yielded a beautiful white silvery-looking button, of the weight of 620 grains; its specific gravity was 8.575, and it was almost as soft as copper. Its malleability seemed very great indeed, for a piece of it was rolled out nearly to the thinness of tinfoil; it showed, however, a disposition to tarnish after a few days' exposure to the air, and became then of a pale yellow color—a kind of green-sickness tinge. Its magnetic properties were less decided than those of either cobalt or iron; and, judging by the globular form and other evidences of perfect fusion in the button, I believe that nickel is much more fusible than the two metals just mentioned. When portions of it were melted with copper and zinc, in the quantities usually adopted to form albata, it produced a compound vastly superior in appearance to any of the miserable make-shifts that now disgrace our markets. Indeed, I am quite convinced that it would well repay any respectable person to commence the manufacture of pure nickel; and it would not surprise me, if a compound of aluminium and nickel could be formed, which, for beauty of appearance, might equal silver, and surpass it in durability and freedom from sulphurous deterioration.

"Whilst alluding to the advantages of an improvement in the manufacture of nickel, it may not be amiss for me to notice two points of some importance in the way of improvement. At present the extraction of nickel from the ore is made to depend very much upon the affinity of arsenic for that metal, so as to form with it an arseniuret of easy fusibility and sufficient specific gravity to separate freely from the melted slag or gangue; and for this purpose large quantities of arsenic are employed by the workmen, not only to the detriment of their own health, but also to the injury of their neighbors. This pernicious practice is quite unnecessary, as I have myself proved by experiments upon a large scale; for example, after carefully roasting six hundred-weight of the common ore of nickel, which is an arsenio-sulphuret, I mixed it with half its weight of chalk, and threw the mixture into a cubilo furnace in full blast; the result was, that the lime of the chalk formed, with the quartz and oxide of iron in the ore, a perfect flux, whilst the oxide of nickel, being easily reduced to the metallic state, fell, in that condition, into the well of the cubilo, from whence it was run out in a melted form, and readily separated from the slag. There was no appreciable loss of nickel in this operation, and the rough metal was found to contain 88 per cent. of pure nickel, the rest being cobalt and iron, with a little sulphur, but no arsenic could be detected in it; moreover, this rough metal might, from the cheapess of the process, have been profitably sold at 3s. per lb., and was decidedly more pure than the ordinary commercial nickel.

"The other point to which I have alluded is applicable to the wet mode of separating nickel, and depends upon a fact hitherto, I believe, unnoticed by chemists. If we have in solution a mixture of the sulphates of nickel, cobalt, zinc, manganese, iron, and copper, we have only to add to this solution, in a warm state, as much sulphate of ammonia as it will dissolve, and then set it aside to cool. Almost every particle of the nickel and cobalt will separate as a green crystallized powder, and leave the other metals in solution. The explanation is very simple. The sulphates of nickel and cobalt form triple salts or alums with the sulphate of ammonia, and these salts are absolutely insoluble in a cold saturated solution of sulphate of ammonia, particularly when this solution is slightly acidulous. I shall conclude these remarks upon nickel by stating that this metal appears to possess the property of 'welding' like iron. At my request, a workman heated two small bars of nickel, which had been previously powdered over with borax, the bars were heated in a forge, and the two hot ends 'jumped' together, that is to say, the white-hot ends were forcibly driven one against the other by gentle blows with a hammer, applied to the other ends, the symmetry of the bar being preserved by blows applied laterally. Although the point of junction was afterwards subjected to much twisting, straining, and so forth, with a view to test its cohesive power, yet it showed no signs of weakness, even after much cold hammering."

Missouri Cotton.

New cotton fields seem to be springing up in every direction, and fate seems determined to destroy the Southern "monopoly," if possible. A St. Louis paper states that a Mr. A. W. Ridings, of Lafayette county, has just returned from Fort Pillow, whither he has been for the purpose of procuring cotton seed for himself and neighbors. Mr. Ridings brings with him three tuns of this seed, which will plant about two hundred acres. The probability is that more will be obtained, and the culture of cotton introduced on a somewhat extensive scale (for a beginning) in some of the Missouri river counties. The experiment of raising cotton in Lafayette county was tried successfully last season. A few acres were planted, yielding one hundred and fifty pounds to the acre. At fifty cents per pound, the production of this staple pays better than that of hemp at $200 per tun, which, by the way, is considerably above the market price. Very little attention has hitherto been paid to cotton-raising in that State. Only one hundred bales were produced in 1860, which would now bring over $40,000. But there is no question that, so long at least as the war continues, the culture could be made very profitable there, particularly in the Southern and South-eastern counties.

Maple Sugar.

A correspondent of the *Country Gentleman* thus describes his method of making maple sugar:—

"The sap, when gathered, should be boiled as rapidly as possible, for sometimes a very short time standing will injure the quality of the sugar, especially if the weather is warm. For the purpose of making a nice article and for boiling fast, you should sirup down once a day at least. The sirup should be boiled down so that it will drop from the edge of the dipper in broad drops like honey; then it is ready to dip out and strain through a wooden strainer into a clean barrel kept on hand for the purpose. It should then be allowed to stand eight or ten hours to settle. For sugaring-off I use an iron kettle of about 14 gallons, fill it about two-thirds full, stir into it two eggs well beaten, put it over the fire and when it comes to the boiling point the scum will rise, which should be carefully removed; then dip out until you can't boil it over, and as soon as it gets like soft wax return what you dipped out, in small quantities, until all is returned. Keep a good fire from the start; you can't boil too fast. There is no danger of burning until the water is all gone, then you should take it from the fire. To try it, drop it into water, and if it will snap like rosin, it is done."

Genius and Talent.

What is genius? Genius is the bird that sits and sings and soars as her feelings move her. She rises like the eagle on her heavenward way; she touches the tops of the loftiest crags, and if she comes down to the vales and plains below, it is but to descend gracefully and dip her plumage in the crystal waters of the mountain lake. Genius is the anvil of the dragon, which, uplifted, evokes all earthly and divine things; unlocks all secrets of nature, science, and art; which calls, and is answered; which says, and it is done; which commands, and it stands forth; which makes things of what were not things. But we promise to show not only what this strange and mystic power called genius is, but also what its relations are to talent and to tact—other forces upon which it depends for its best manifestations and most beneficent results. What is talent, and what is the connection between it and genius? Talent is a faculty of the mind which enables it to put forth useful effort. "It comprises general strength of intellect and a peculiar aptitude for being molded to specific employments;" such is the definition the learned give us. Talent, too, is the result of training in no such sense as genius is. We would call it an acquisition rather than an endowment. For instance, a man, as the result of years of patience, industry, and faith, may paint a good picture; or carve a statue or write a poem. By following certain maxims and rules in literature and art, he may acquire an aptitude for certain special kinds of labor. But if he be a painter, he cannot paint like Appeles; he cannot make cherries look so natural that the birds of heaven shall be deceived and come and peck at them. Talent in painting, sculpture, architecture, or any other art, may result in considerable progress and efficiency, nay, may lead to respectability on the part of him who exhibits it; but that is all; eminence is impossible to any efforts save those of consummate genius. Nevertheless, talent, as we have said, is not to be despised; nay, it will accomplish what genius itself cannot achieve. Talent is intellect in its vigor and strength, and it is that which rules the world. If it cannot plan cathedrals, it can build them; if it cannot shine as the sun, it can twinkle as the star; and genius herself must look through windows constructed by eye and ear and head of this homely yet useful power.—*National Quarterly Review.*

A Wonderful Clock.

A good compliment was paid to the electro-magnetic watch-clock by a distinguish scientific gentleman—one of the party that accompanied Gen. McClellan when he visited the Pacific Mills at Lawrence. One of these clocks in that establishment records the duty of four separate "watchers," or men who perambulate about 16 acres of flooring and all the outside premises; the record shows the position of every watchman at every moment during the night, and the length of time which was occupied in going from room to room. One of the record-dials was under examination, which showed that at a certain time, and a certain part of the mills, on a previous night, one of the men had suffered a long time to elapse between his visit to one room and the next. When the man was told in the morning just when and where he had been derelect of duty, he confessed that he had then and there fallen asleep. "Ah," said the man of science referred to, "this invention should not be called a clock, but 'a mechanical conscience.'" —*Boston Com. Advertiser.*

Value of Old Sherry Wine.

In an article on wine the *California Wine and Wool Grower* says:—

"In no other part of Spain is there made any white wine at all comparable in flavor with that made within a small distance around Xerez de la Frontera; respecting which, it may be further stated, that no other wine improves by age in an equal degree; so well established is this fact among the great wine exporters of St. Marys and San Lucar, that scarcely any price would induce them to sell their *Madres Botas* (mother butts) that have arrived at more than thirty years of age, and some affirm that they have such as old as sixty years certain—and probably containing some wine double that age, having been filled up from vintage to vintage; as an estimated value, such *Madres Botas* have had a price set on them equal to $5,000 per butt of 130 gallons, or about seventy cents per wine-glassful; we once had an opportunity of tasting some, a quarter butt of which was invoiced at $1,000, and cost the owner, when bottled, about sixty-five cents per glass."

THE FIRST CANNON.—The first iron cannon is said to have been cast in Sussex, England, in 1535. Bonds were taken in after years from owners of charcoal furnaces to the amount of $5,000, that no cannon should be sold without a license. It was feared that the French would obtain them.

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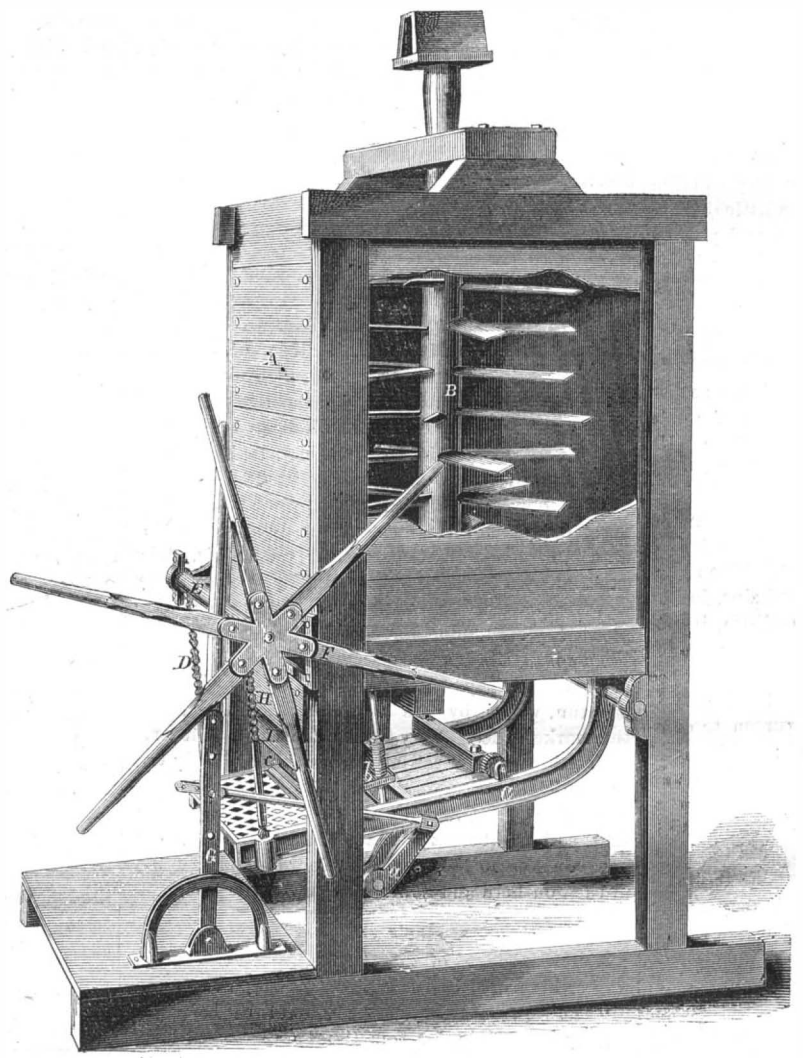
Improved Brick Press.

A great many machines have been invented to improve the manufacture of bricks for building purposes, with a view of rendering them equal to those made by hand. Costly and powerful apparatuses have been erected and put in operation with varied results. The machine here illustrated is certainly very simple in its construction and operation; it is said to be a very great improvement over others in use. The mud box, A, receives the clay and tempers it by the operation of the knives on the vertical shaft, B. These knives are set with their cutting edges uppermost and are placed at an angle with a true plane; they are also fixed in the shaft irregularly, with reference to their positions relatively. Below the box may be seen a frame, C, jointed to a shaft at one end, and connected by rods and chains, D, at the other, to the transverse shaft, E, on which the hand-wheel, F, is secured. The upright lever, G, is connected by a light rod to the arm, *a*, on a small shaft running under the frame. On this shaft there is a toothed quadrant working in a rack on the brick molds; these cannot be seen in this view of the machine. The press box, H, contains another box, I, working in it, which is called a "clod-crusher;" this clod-crusher has curved sides in order that it may conform to the motion of the frame, C, on its bearings. In the bottom of the clod-crusher there are a series of parallel bars; the width between them corresponding to those in the compartments of the mold box before mentioned. The upper sides of the bars are beveled so as to form sharp or angular edges. The clod-crusher is not attached directly to the frame, but has a projecting plate on each side of the lower part through which upright rods, *b*, on the frame pass; these rods have shoulders and spiral springs, held in position by nuts; the whole serving as a stop or rest for the clod-crusher.



LAFLER'S PATENT BRICK PRESS.

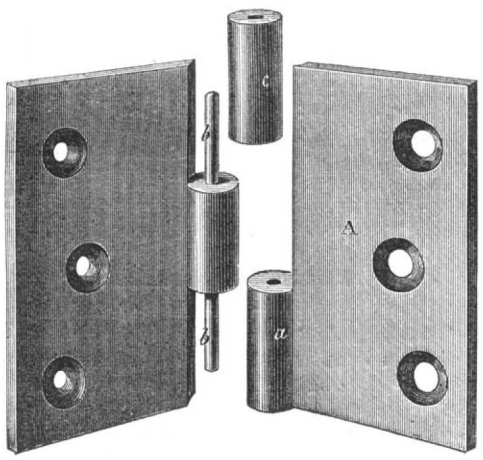
The front part of the frame projects some distance beyond the press box, and is connected by the chains, previously mentioned, to the hand-wheel. There are in addition a set of friction rollers, *c*, in the frame directly beneath the clod-crusher. These details comprise the main features of the machine visible in our view of it; the operation of them is very simple. The clay being thrown into the press box it is mixed and tempered by the action of the knives; these knives perform two functions—they mix the clay, and also force it downward, by their oblique position on the shaft. At the bottom of the press box there are a set of scrapers which sweep the clay into the receptacle or mold box there placed, as they pass over the apertures. The mold box to be filled is placed on the frame and forced underneath the clod-crusher by drawing the vertical lever outward. As the mold box passes underneath the clod-crusher, the latter is allowed to yield, or give slightly in an upward direction; this causes the crusher to fit snugly under the mold box. When the latter is adjusted properly, the operator turns the shaft by the hand-wheel, elevates the frame and forces the clod-crusher upward within the press box. By this movement of the crusher the clay is compressed between the bars and well compacted in the molds. When they are thus filled, the frame is covered, an empty box is put upon it, and the lever thrown in so as to push the filled box out from under the clod-crusher, and the empty one in the position to be re-filled; this operation is repeated as often as necessary. This machinery is said to make very perfect bricks, and was patented, through the Scientific American Patent Agency, on Jan. 6, 1863, by J. A. Lafler, Albion, N. Y.; further information can be had by addressing him at the above place.

Prize-money and Prize-agents.

The late act of Congress has a humane and judicious provision, which renders unnecessary the employment of agents or attorneys to collect price money for officers, seamen, or marines in the Navy. It provides that prize-money shall be paid to the Navy Department, and by the Department credited to each officer, seaman, or marine on the books, and paid to him, as his wages or salary is paid, by the paymaster. This notice may save anxiety and expense to officers and seamen.

ARCHER'S PATENT HINGE.

The hinge here illustrated represents one of those devices which are very useful in a great many cases.



By the arrangement of the parts with relation to each other, the hinge can be used either at the right or left hand of a door. The construction of it is very simple, and is clearly explained by the engraving. One leaf of the hinge, A, has the screw holes countersunk on both sides. The joint in which the pintle, *b*, works, extends but a short distance from the end and fits over the pintle when in its natural position. The small cylinder, *c*, is intended to be slipped over the pintle also, thus making the connection between the several parts complete. When necessary the change from right to left hand can be effected instantaneously by simply removing the loose cylinder and turning the leaf, A, upside down from its former position. The advantage of such an arrangement as this will be readily appreciated by builders and others interested in such matters.

This hinge is the invention of G. W. Archer, of Ipswich, Mass. An application for a patent is now pending through the Scientific American Patent Agency. Further information may be had by addressing the inventor as above.

Dreadful Boiler Explosion.

The boiler of the small steam tug-boat, *D. E. Crary*, exploded with terrific violence on March 24th, at the foot of Spring street (North River), this city. The boat, boiler, and machinery were nearly new. The engine was high pressure, and the boiler had been tested and warranted to carry 100 lbs. pressure. The engineer and four others were killed; pieces of the boiler and fragments of the machinery and boat were hurled to a great distance, and the wreck of the hull was sunk. It seems from the statement of the captain, who escaped with severe scalds, that a fire had been under the boiler for two hours before the catastrophe, and they were just about to start the engine. It is supposed that the water in the boiler was low. In all likelihood the entire atmospheric air had been expelled from the water, thus rendering it explosive, as explained on page 201, current volume of the Scientific American. Boiler explosions are mostly all due to known causes. Quite a number have taken place under similar conditions to that of the *D. E. Crary*. Nine-tenths of them could be prevented by carefulness on the part of the engineers.

A Central Trades-Union.

A very large meeting of representatives from the different trades in the city was held at the Cooper Institute on the evening of March 24th, for the purpose of forming a central Trades-Union. Charles McCarty was chosen chairman and stated the objects of the meeting. Speeches were made by delegates from the tailors, painters, bookbinders, hatters, coach-makers, shipwrights, bakers, plasterers, coopers and shoemakers. From a set of resolutions that were passed, the object of the Union seems to be for mutual support in an effort to obtain higher wages, as the cost of living has greatly increased lately. This Union appears to be similar in its features to the Trades-Leagues in London and Dublin.

Stone Piers for New York.—On page 121, current volume of the Scientific American, we directed public attention to the utility of stone piers as a substitute for the present timber structures in New York. A committee of the Board of Aldermen has since investigated the subject and made a report, to the effect that two stone piers be erected—one on the East River and another on the North River. This is a commendable movement. New York is behind every important commercial city in the world, in the character of her wharves.

Domestic Sugars.—The Wilmington (Ohio) *Journal* says:—"We are informed that a larger quantity of maple sugar and molasses has been manufactured in our county, this season, than ever before."

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THE NECESSITY FOR BODILY EXERCISE.

The human body is a wonderful machine. Viewed automatically it demands our fullest admiration for the manner in which it performs its various functions. Man is an automaton; he is one not only in habit, but also in thought; he is too apt to do as he sees other people doing. It is the usage of our people to drink in public to a greater or less extent; it has become a standing joke against us that, when friend meets friend, the invariable habit is to repair to the nearest bar and imbibe. Man smokes; he was not born to smoke, he adopted the practice; through sorest pain and direct physical disturbance, he was inducted into the art of drawing in the fumes of tobacco, and then puffing them out again, this also is done automatically; mechanically; when reading, thinking, traveling, or—what not?

It is not the normal condition of the animal, man, that he should smoke, drink, or do any other foolish thing; if he will do it, however, he ought to repair the damage to his frame and morality as speedily as possible. This he can do, first, by abstaining from the source of disease; and secondly, by the aid of moderate exercise, strengthen the impaired forces of the body. Man's brain was given him for a divine purpose; it was not merely intended as a sentinel to warn him when he was drinking or eating to excess; when either of these practices obtain, the seat of the mental power is undermined, reason totters, and man becomes a fool. The brain partakes of the condition of the body. Are the digestive functions in good order and the other parts of the frame in like condition? Then the thinking organs are not dormant but active, they are not feeble but strong.

Inaction rusts out the body. Torpidity resolves muscle into flabbiness, and bone into a chalky structure without integrity or value. Lazy men are generally flaccid, vapid, insipid to the last degree; vigorous exercise would do them good; and one is tempted to apply a slight pedal impetus to their exhausted frames, in the hope of doing them some lasting benefit.

If our assertions are correct, then the necessity of exercise, in some shape, is fully apparent, and he who neglects his future health at the expense of present comfort, inflicts an injury, irreparable in after years. Gymnasiums exist in every large city, and if they are not convenient, saws and axes are; all other things being equal, these are perhaps even better than a solemn and set way of invigorating the feeble organization by stated periods of jumping or pulling. The patient in pursuit of health destroyed by sedentary practices or bad habits, derives but little benefit from mere physical activity, unless his brain enter into the spirit of it also. All the forces of the body are naturally enfeebled by dwelling too long on one subject; they have run in the ruts of thought or the channels of trade until suddenly the vitality is impaired, the brain becomes feeble and powerless, and the once able writer or sound thinker is a comparative cipher. There can be no more melancholy spectacle than that of an invalid in pursuit of health under difficulties, solemnly, even morosely as it appears, lifting a huge dumb-bell with his mind dwelling the while upon some point of law or some question of profit and loss. No! no! let us have no such mockery of exercise as this; throw care to the dogs, and go at the regeneration of the wasted functions with a will; let us recuperate the exhausted forces as if it were a pleasure and not a pain. Run off the track, mentally, if you wish to be healthy; relax the toil of thought, unbend the austere brow, freighted with wisdom and wrinkles. We know some very excellent men, who, although not compelled, perform the so-called menial offices about their houses; they bring coal, they split wood, they draw water; and when they draw it, they are dipping all unconsciously from the fabled fountains of health which Ponce De Leon sought so long and unavailingly. The inference is not that if Ponce had split wood, &c., he would have found the spring of perpetual youth which he desired; but that the means of assisting nature to reproduce that wonderful organization, the human body, exist on every side.

"Jonathan" is reproachfully designated as a lazy fellow, and not without some show of reason. He rides in cars, he lolls in rocking-chairs, and he has stuffed sofas on which to recline after he comes home from the weary and consuming exertion of sitting in a chair down town all day. Let "Jonathan" get up and walk more—as much as his English cousins do, and he will have thicker legs and a better and more graceful anatomy generally. "John Bull" is, to speak mildly, given to ponderosity in front; his is not an elegant figure, but he is healthy and hale; and we think a little more attention given to daily exercise would result beneficially on our vigor as a nation.

USEFUL INFORMATION ABOUT BOILERS.

The "Association for the Prevention of Steam Boiler Explosions," in Manchester, England, through its Chief Engineer, Mr. L. E. Fletcher, publishes mouthly and annual reports of a most valuable character to all who make and use steam boilers. Its last annual report has been published nearly in full by the *Mechanics' Magazine* and *The Engineer* (London), and from these we condense the following:—

One of the most fruitful sources of fracture in boilers is the unequal expansion and contraction of their different parts on account of the various temperatures, which are caused in many cases, though not in all, by imperfect circulation of the water. Grooving manifests itself in the double-flued boilers at the tube angle-irons and end plates, more especially at the furnace mouth, and it is more active in proportion as the end plates are rigidly stayed. In no class of boilers is this action so destructive as that in which the furnace tubes are brought so close together that there is not room for the angle iron at either end of the flue to be carried completely round them, and which, therefore, requires to be supplemented with a saddle-plate, which, with its complement of the two partial angle-iron hoops, forms a "spectacle piece." These saddle-pieces are found to wear in grooves so deeply that in some cases the whole thickness of the plate is eaten through. Channeling is also frequent at the transverse seams at the bottom of the shell of internally-fired boilers. Boilers with two furnaces running into a single oval flue, containing a number of vertical water tubes, have the advantage of a more rapid circulation of the water; this is calculated to prevent transverse channeling at the ring seams and grooving at the angle irons. Corrosion is found to be going on in all boilers. A fruitful source of this evil is found in the leakage of blow-out pipes, at their attachment to the shell. Boilers are also subject to very rapid exterior corrosion where they come in contact with damp brick-work. Internal corrosion arises in many cases from acidity in the water. When this is the case corrosion may be prevented by the use of carbonate of soda. One firm in Manchester, having several 50-horse-power boilers, use half a pound of the carbonate of soda in each per day. This neutralizes the acidity of the water and has been found beneficial. It is added in small doses and may be fed in by the feed pump. Incrustations in boilers are great evils. A partial remedy has been adopted in marine boilers by frequent blowing out at the surface. The scum which rises on the surface of the water is then discharged through a suitable pipe. In most cases the use of a moderate quantity of the carbonate of soda, combined with blowing out the boiler at the surface, will prevent incrustations. Surface-condensers, however, afford the most radical prevention of incrustation in all boilers. The condensed steam is pure distilled water, and as it is used over and over again in the boilers of engines which have surface condensers, no incrustations can be formed in them.

During the year 1862, thirty boiler explosions occurred in Great Britain, by which eighty-seven persons lost their lives and eighty-nine were injured. Of these thirty explosions eleven occurred to externally-fired boilers, from failure of the plates that were directly exposed to the action of the fire, three resulted from internal corrosion, three from external corrosion, four were due to improper construction, one to shortness of water, and another to accumulated pressure of steam for want of a safety valve; this was the boiler of a kitchen range. Particulars as to the causes of the other seven explosions were not obtained.

In the Manchester district surface blowing-out in boilers has made considerable progress, and the use of the steam jacket for cylinders has been revived. With respect to its utility Mr. Fletcher says:—"The steam jacket has, in combination with the use of highly-heated steam, been the principal element in the attainment of that economy for which the Cornish engine has long since been notorious." Surface blowing-out of the boiler, surface condensation of the steam in condensers, and superheating are due to marine-engineering practice; these changes have developed higher economic results.

PRESENT CONDITION OF THE "ROANOKE."

The iron-clad steam battery, *Roanoke*, is rapidly approaching completion, and it is thought that steam will be applied by the 1st of April. The turrets are nearly finished and the pilot-houses are already completed. The smoke-stacks are in place, as are also the guns and miscellaneous fixtures generally. Her armament will be one 15-inch gun and one rifled 200-pound Parrot gun in the forward turret; one 11-inch gun and one 15-inch gun in the midship turret, one 11-inch gun and one rifled 200-pound Parrott gun in the after tower.

Down "below" all things are rapidly assuming an appearance of order and system. The ship is literally full of steam engines, there being no less than twenty-two of all shapes, sizes and varieties on board of her—trunk, oscillating, horizontal and vertical engines—each and every kind are here represented and have some special duty assigned them. Those who are fond of statistics might employ a few hours by figuring up the amount of horse-power contained in the steam machinery on the *Roanoke;* the result would be interesting. The ship draws but 20 feet of water forward, at the present time, and will have to be brought down lower to use her ram effectually. She is very little submerged with the present load.

NUT LATHES.

In our walks through machine-shops the idea has frequently occurred to us that it would very much expedite the work and economize the time if lathes were made solely for turning and facing up nuts. There may be some such tools in existence, but in all our experience we have never met with them. They ought to be made so as to face both sides at once; this can be done with two tools; the only difficulty is to hold the nut, but this trouble can be removed, we think, by our inventors. Quantities of nuts are now made, we are told, by firms who manufacture solely for the trade, and if finished nuts could be bought readily by our machinists, of a standard size and thread, they would fill a great desideratum. The process of turning nuts now is accomplished, by boys, very cheaply; but if the same boy could do twice or three times the work he now does, the nuts would of course be cheaper still.

LOCOMOTIVES.—We learn from the Poughkeepsie (N. Y.) *Eagle* that there are sixty-five locomotives in use on the Hudson River Railroad; thirty-two of them running between that city and New York, and thirty-three between that city and Albany. Thirty-five of them are coal-burners, twenty-nine wood-burners and one a hard-coal-burner. Estimating the price of each locomotive at eight thousand dollars, it would foot up five hundred and twenty thousand dollars invested in locomotives by one company.

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CALIFORNIA GOLD.

About two years ago, the Emperor of France sent out M. Laur, an engineer, to explore California and the gold regions of the Pacific range of mountains; and the war between France and Mexico, it is thought by some, has for its ulterior object the securing of a portion of the gold regions for France. A summary of these explorations has been published in the *Revue des Deux Mondes*. The Sierra Nevada, in Upper California, is described as a mountain with "a cloak of gold." The gold of California is considered by M. Laur to be of more recent formation than the rocks which contain it. Long after the quartz rocks had been formed a great geological commotion took place and portions of the extensive Sierra Nevada were then elevated. The crust of the earth was then opened up, and fused matter came forth seething from the interior of the globe. Streams of sulphur, iron, gold and other metallic substances flowed out of the subterranean furnace, and poured like floods over the face of the country. These oozed into the upper strata of certain rocks, and thus they were impregnated with veins of gold. The precious metal entered and condensed in the fractures of the rocks, caused by the upheaving commotion. Such is the supposed origin of the primary deposits of gold in California. This volcanic phenomena probably took place when the continent of America was covered with seas violently agitated. The surface deposits of the gold were washed out, rocks were also disintegrated, and layers of sand, gravel and clay were spread over the whole country. By this aqueous action much gold separated and arranged itself in layers, thus forming strata called ancient auriferous alluvia.

Another period succeeded this ancient reign of diluvial action. The seas departed, the dry land appeared, and the winds and rains and rivers and streams, acting on the rocks, disintegrated them also, carrying away the sand, and oftentimes leaving the heavier gold behind, concentrated in the main direction of the currents. Hence it has been found in greatest quantities in the ripples of streams and the old beds of rivers. The washing placers, called "wet diggings," are in the ancient alluvia, the gold being there found mixed with the gravel. Formerly, in 1848 and 1849, these yielded immense quantities of gold, but now they are mostly exhausted. The patient Chinese in California can now scarcely realize seventy-five cents per day, for each individual, in such placers. But the gold veins and auriferous rocks remain; and these will be magazines of the precious metals for ages to come. What are called "dry diggings" also yield largely.

HEAT OF THE EARTH'S INTERIOR VOLCANOES.

It is generally believed by men of science, and others, that the interior of the earth is a mass of molten matter, the heat of which is intense beyond that which can be produced by known artificial modes. Many of the rocks which form the crust of the earth appear to have been once in a fluid condition, and no skill possessed by man can reduce some of them by heat to the state in which they once existed. Dr. Siljestrom, a Swedish astronomer, expresses it as his belief that the interior of the earth is occupied by currents of various degrees of heat, which mix with each other and attain a certain degree of temperature in the same manner as substances subjected to all the physical influences of the earth's exterior. In other words, the theory is, that a mass of fluid, possessing different temperatures in different parts of its interior, must be subjected to a process of convection. The result is usually a change of volume in the entire mass of circulating fluid, causing eruptions like those of volcanoes. In Hekla, however—the famous volcanic mountain of Iceland—the heat seams to be local, not proceeding from any great depth in the interior of the earth. A writer in the *London Quarterly*, who has visited it, states that, while vapors were issuing from the black sand on the summit, "in the crater itself, some hundred fathoms below, were gaping ice-holes, and great masses of snow, side by side with sulphureous steam-jets." The poet who used Hekla as an illustration of blowing hot and cold in one breath was true to nature; for, strangely enough, while one part of the cone is quite cold on the surface, steam is issuing from another part higher up, showing that the heat is local, and dependent upon the fiery character of the under beds. This is proved by the experiment of an Icelander at another place, who discovered that the heat began two feet below the surface. Beneath that depth he came to a violet-colored layer of soil of sulphurous odor, where the heat was greatest. Lower still it was found to be less and less, until at the depth of nearly eleven feet there was no heat at all. The depth of greatest heat at Krisuvili was ascertained to be twelve feet beneath the surface, and below this the heat diminished. It is remarkable that, during the eruptions of Hekla, vast floods of water and ice pour down its sides with solid rocks and fiery sands. The waters from the volcano flow over vast tracts of low lands, like the freshets of a great river. Where this water comes from is a mystery that has not yet been fully solved.

GRIND THE TOOLS.

Keep the tools sharp or they will not cut. A dull tool wastes time, and he who permits it to work when in that condition, is a dull fellow. The best turners are those who have the sharpest tools; the most successful surgeons use the keenest knives, and the most enterprising and energetic men in civil life are those whose wits have been early ground sharp, and whose perceptive faculties have been whetted by sore experience in early life. A dull tool is a useless implement, and a thick-headed, unobservant person is the only one who should be found wielding it. The obtuse edge neither cleaves nor separates, but bruises and works off by attrition particles of the substance on which it operates. Grind up the tools, and sharpen the wit as well; if one is keen, the other will in all probability be in a similar state, from the force of sympathy alone. A boy with a dull pocket-knife is one who swings on the gate and who dodges his duty; he is one who in after-life will be a dunce and a cumberer of the ground; he will add nothing to the world of science, neither will he take from it; his existence is merely animal, his thoughts and ideas, if he has any, wholly conventional. His comrade, with a keen blade, makes models of machinery, of boats or steamers, and in time he becomes a George Steers, or so develops his mother-wit as to be a decided acquisition to the community. Let us have all the tools in good condition, sharp, trenchant, and always ready for service; then, and then only will the result produced be equal to the time and labor expended.

MISCELLANEOUS SUMMARY.

Fire-arms.—Colt's Patent Fire-arms Manufacturing Company, at Hartford, Conn.—now, since its enlargement, the most extensive armory in the world—is in very full operation. There are five buildings, each 500 feet long, three of them three stories high. They would make a continuous building 2,500 feet in length by 64 feet wide. The motive-power consists in one engine of 400 horse-power, two of 350 horse-power each, and one of 75 horse-power; all but one built by the celebrated firm of Woodruff & Beach. There are nearly 1,600 hands constantly employed on arms for the Government. At Sharp's Rifle Manufactory about 500 hands are employed. The Government take all they make. These works have been considerably enlarged and improved recently, and still further improvement is contemplated.

Embalmed Bodies.—Some time since, in clearing out the ruins of an old chapel in Warwickshire, England, several leaden coffins were exhumed containing embalmed bodies buried more than two hundred years ago. The coffin which contained the body of Lady Audry Leigh (buried in 1640) was opened and the body found perfectly embalmed and in entire preservation, her flesh quite plump, as if she were alive, her face very beautiful, her hands exceedingly small and not wasted. She was dressed in fine linen, trimmed all over with old point lace, and two rows of lace laid flatly across her forehead. She looked exactly as if she were lying asleep, and seemed not more than sixteen or seventeen years old; her beauty was very great; even her eyelashes and eyebrows were quite perfect, and her eyes were closed; no part of her face was at all fallen in.

Proligneous acid and sulphate of zinc, twelve drachms of each to seven pounds of water, form a fine preservative fluid. Human bodies injected with this mixture will keep during the most intense heat of summer. Glycerine has been justly recommended in various affections of the skin; but it is especially valuable in that troublesome affection in which the hairs become dry and fall off. During the abundant epidemic exfoliation, undiluted glycerine may be applied with excellent effect. A mixture of equal parts of oil of almonds and glycerine, and one half oxide of zinc, has proved useful in some skin affections.

Sugar.—Sugar in plants is analogous to fat in animals; as if it was the end a plant had in view by its vitality to produce and lay up in store within itself—sugar; hence, the subservience of plants to man in this case is self-evident. Nearly every flower-cup contains a minute portion of sugar, which, being gathered by bees, we are familiar with as "honey," the peculiar flavor of which depends upon the blossoms it is taken from. Grapes are so full of sugar that, when dried, white crystals of it are found within the fruit, which may be seen when raisins are cut open.

A New Toy Gun.—A very unique toy gun for children has been invented by Mr. I. S. Clough, of 290 Pearl street, this city, and it will doubtless become quite popular. It is a very mysterious and deadly-looking weapon, but is as harmless to the user as the veriest wooden gun in existence. We are prohibited from publishing any details of the construction of this gun as it might be of advantage to our enemies. (See advertisement in another column.)

A Humming Bird's Nest.—A California paper thus describes a humming bird's nest, in the garden of Wm. Hawley in Marysville:—"The nest contained two of their young. It is about the size of a black walnut, of a very fine texture, almost white, much resembling woolen cloth, and firmly bound to the twig of a peach tree, within three feet of the ground. The young birds are not much larger than grains of coffee, and present a very singular appearance."

The New Iron-clad Fleet.—The Navy Department finds some trouble in contracting for the new iron-clads. One has been contracted for at Wilmington, Del., and one in Philadelphia, Pa., by Merrick, for $380,000, but the new York builders refuse to touch one for less than $500,000. The Department has applied to Captain Ericsson to try and make the plans less costly.

Melon-ground.—Look well to the linings of beds and keep up a good heat; as they advance keep the vines both of melons and cucumbers evenly trained over the surface. Add fresh mold gradually as required; remember that melons like a firm—we might almost say a hard—bed to grow in; therefore, the soil in which they grow should be quite firm. Take care in planting out or earthing-up not to cover the plants deeply at the collar or bury the seed leaves.

A Blind Workman.—A young man in Greenock, Scotland, of the name of Kid, who was blind from his infancy, finished the model of a sixty-four gun ship, and every necessary material and appareling of a ship of that rate, without any assistance whatever or other instrument than a small knife and hammer.

Discount and Premium.

An erroneous opinion is entertained by many persons respecting the real amount of depreciation in paper currency as compared with gold. Thus it is believed that, when a gold dollar commands a premium of fifty cents in paper currency, the depreciation, of the latter amounts to fifty per cent. In such a case the depreciation is 33⅓ per cent. Gold quoted at fifty per cent. premium means that it requires 150 paper dollars to purchase 100 gold dollars, or that 100 paper dollars are worth 66⅔ gold dollars. Thus \$150 : \$100 : : \$100 : \$66⅔—a depreciation of 33⅓ per cent. Supposing one yard of woolen cloth can be purchased for one dollar in gold, and the gold coin commands two dollars in paper, the depreciation of the paper currency is fifty per cent., as half a yard of the cloth can be bought for one dollar in paper. This case practically illustrates the operation of premium and discount between gold and *paper*.

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DISCOVERIES AND INVENTIONS ABROAD.

Preparing Red Colors.—We should judge from the great number of patents which have recently been taken out in France and England, for applying and preparing coal-tar colors, that these have nearly superseded (in Europe) all the colors which were formerly derived from innumerable dye-woods. The following is the condensed description of a patent, obtained by W. Spence, of London, for obtaining a fast brilliant red by the transformation of carbolic acid. The inventor takes 23 pounds of phenic or carbolic acid, about 15 pounds of oxalic acid and 10 pounds of sulphuric acid, and mixes these together in a vessel heated over a fire. A deep greenish substance of the consistency of pitch is thus produced, which is washed with boiling water to remove the excess of acid in it. It is next thoroughly dried and reduced to powder. About 2½ pounds of this product are now mixed with 5½ pounds of the ammonia of commerce, placed in a close vessel and submitted to a heat of 270° Fah., for three hours, then allowed to cool in the vessel. The coloring matter is now found to be dissolved in the ammonia, forming a thick liquor. When this is treated with sulphuric or hydrochloric acid it forms a deep red precipitate, called *peonine*, which is capable of dyeing silk, wool, and other textile fabrics a fast red color.

Preparing Blue Colors.—In order to obtain a blue color for dyeing and printing, Mr. Spence mixes five parts, by weight, of the above-described red coloring matter with six parts of aniline, and subjects the mixture to a heat of about 210° Fah., for about three hours, when the red color is gradually transformed into a blue coloring substance, which is washed thoroughly with water, then boiled in water acidulated with sulphuric or hydrochloric acid. After this it is heated with coal oil and again washed with a dilute solution of caustic soda, then mixed with boiling water acidulated with sulphuric acid and dried. It is now obtained in powder of a golden shade; it is soluble in alcohol and methyle, and is suitable for dyeing and printing generally.

Printing Coal-tar Dyes.—W. H. Perkin, of Sudbury, England, has also taken out a patent for printing and dyeing coal-tar colors on cotton and linen fabrics. He takes either aniline purple, violet, blue de Lyon, or magenta, and mixes it with 1,000 parts of the acetate of alumina, having a density of 10 degrees in Beaume's hydrometer, and 80 parts, by weight, of arsenite of soda, and stirs them all together and then adds starch or gum to thicken the solution for printing. It is applied to the cloth by machinery used for printing, after which it is submitted to the action of steam in the usual manner of steaming calicoes. The aniline colors are first dissolved in alcohol, before being mixed with the mineral mordants, at the rate of 16 parts of dry coloring matter to the 1,000 parts of the acetate of alumina. For the magenta color about 136 parts of the arsenite of soda is used, but for the other colors only 90 parts. The application of aniline colors to calicoes is very troublesome. One of our New England calico-printers told us recently that he had found it very difficult to mix such colors for printing on cloth.

Blue Coal-tar Color.—A patent has also been taken out by E. C. Nicholson, of London, for a soluble aniline blue color, obtained by the mode described as follows:—He takes, by preference, the substance known as "blue de Lyon" or that known as "azaline," these being blue-coloring matters obtained from aniline and similar bases. He extracts all soluble matter from it by boiling it with water containing sulphuric acid. He employs for this purpose the said acid in the proportion of about four ounces, by weight, to every gallon of water. When all or nearly all the soluble matter is extracted, he collects the insoluble matter and dries it thoroughly. He then takes this substance, reduced to powder, and adds to it about four times its weight of concentrated sulphuric acid of commerce, and he raises the temperature of the mixture to about 300° Fah., and keeps it stirred until all is dissolved; and he then maintains it at about this temperature until a sample, when added to water, is entirely dissolved. If the temperature is raised too high sulphurous acid is evolved and the dye gradually destroyed. The acid solution can be diluted and used for dyeing or printing in the ordinary way, or, if too acid, the excess of sulphuric acid may be removed by lime or other suitable alkali; or, if an excess of lime be added, the sulphuric acid is entirely precipitated in the form of sulphate of lime, and a colorless solution is obtained which, when neutralized with any vegetable or other acid, developes the improved soluble blue dye.

Caustic Soap in Cleaning Flax.—A patent has been taken out by Mr. Henry, of London, for the use of a very caustic soap in the treatment of vegetable products, such as hemp, flax, nettles, straw, grass, &c., to obtain fiber for spinning. The soap is made by combining a concentrated solution of caustic alkali, with oil, grease or any saponifiable substance, so as to have an excess of alkali. He states that flax, &c., may be taken without any other preparation after being gathered and steeped in a solution of such soap, when the fiber will be dissentegrated from the glutinous parts of the plants, and pulp for paper also obtained. Such treatment of plants containing fiber, with a small quantity of caustic soap, it is stated, answers the purpose of the usual retting process, and the subsequent crushing operations of the plants are rendered much easier: The soap separates the gummy and oily matter from the fiber, and by subsequent washing it is removed with the water leaving a clean and beautiful fiber.

New Product from Sea-weed.—A new product has been obtained from sea-weeds of the order *algæ* by T. H. Ghislin, of London. The sea-weed is first steeped in dilute sulphuric acid for about three hours, then thoroughly dried and becomes hard, after which it is ground to an impalpable powder. About 10 per cent of glue dissolved in water, 5 per cent of gutta-percha and 2½ per cent of india-rubber dissolved in naphtha, and 10 per cent of coal tar, are thoroughly mixed and boiled together. To this mixture 5 per cent of the flowers of sulphur, 5 per cent of rosin, 2½ per cent of alum and 60 per cent of the pulverized sea-weed are added and intimately mixed in the boiling compound. The mass is now placed in an oven and heated to 300° Fah., when it forms a plastic compound capable of being molded, embossed and stamped into various articles useful in the ornamental arts, like gutta percha, as it becomes very hard and durable when cold.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list.

Grain-dryer.—This invention relates to the employment within a tower or shaft through which an upward circulation of air is produced, of a series of screens grated or reticulated platforms, arranged one above another at alternately opposite inclinations and having a vibrating or shaking motion, so that the grain or other substances to be dried being deposited upon the uppermost screen or platform may pass down to the next below, and thence in succession from one to another of the whole series, while the air, circulating upward through and over the screens, absorbs and carries off the moisture with it to and through the top of the tower or shaft. The improvements consist, first, in so combining the whole series of such screens or platforms with a suitable apparatus for raising and lowering one end of each, that the inclination of the several screens or platforms may be varied or adjusted simultaneously for the purpose of regulating the speed at which the grain, or substance to be dried, will descend the tower or shaft, as the degree of its dampness may require; second, in the combination of such a series of screens or platforms and an elevating apparatus by which the grain or other substance to be dried, is delivered on to the uppermost screen or platform of the series. Samuel Schuyler, of Brooklyn, N. Y., is the inventor of this device.

Breech-loading Fire-arm.—This invention relates to the attachment of the barrel to a stationary breech, forming a portion of the stock, by means of a screw arranged below the barrel and parallel with the bore thereof, the opening of the said rear end of the barrel being effected by turning it to the extent of a quarter of a revolution on the said screw, in which movement it not only moves out of line with the barrel to expose its open rear end for the reception of the cartridge, but moves in a forward direction on the screw, and so opens very easily and without friction against the breech. It consists in the employment, in combination with the said screw attachment of the barrel and breech, of a peculiarly-applied stop which serves not only to stop the barrel opposite to the breech in the closing movement, but to stop the barrel in its opening movement, and thereby prevent such movement from being continued further than is needed, and which is so applied as to be capable of being conveniently moved out of the way when necessary, to permit the unscrewing of the barrel from the breech to such an extent as to detach it. It further consists in a peculiar device applied in combination with the said screw attachment of the barrel and breech, for the purpose of partly withdrawing the discharged cartridge cases from the barrel by the act of opening the breech. Charles Jackson and Thomas Goodrem, of Providence, R. I., are the inventors of this improvement.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

Process for making Malleable Iron direct from the Ore.—Moses S. Salter, of Newark, N. J., obtained a patent on November 20, 1849, for an improved process for making malleable iron direct from the ore; and he has applied to the Commissioner of Patents for the extension of that patent for a term of seven years. The testimony will close on May 18th, and the petition will be heard at the Patent Office on June 1st.

Drying Grain.—Joseph H. Patten, of New York city, obtained a patent on June 19, 1849, for an improvement in drying grain; and he has applied to the Commissioner of Patents for the extension of that patent for a term of seven years. The testimony will close on May 18th, and the petition will be heard at the Patent Office on June 1st.

Magazines and other Publications Received.

THE ANNUAL CYCLOPÆDIA FOR 1862. Published by D. Appleton & Co., New York.

D. Appleton & Co. have rapidly passing through the press the second volume of the new annual publication, which was received with such favor by all classes of the community. Its contents embrace the material and intellectual progress of the year, particularly in this country; the important civil and political measures of the Federal and State Governments; an accurate and minute history of the struggles of the great armies and the many battles, illustrated with maps of the country and plans of the actions, taken from official copies; the proceedings in the Confederate States to maintain the war and establish their Government; the debates of the Federal and Confederate Congresses; the financial measures of the Government, the commerce, &c.; also, the progress of foreign nations, including the Mexican Expedition; the ignominious flight of Otho from Greece: the Tae-ping Rebellion in China; the cautious march of the Russians into Persia, their intrigues in Afghanistan, and their march to the Chinese frontier; the Cochin China war; the distress of the Lancashire operatives; the stoppage of the looms of Mulhouse and Lyons; also the developments in the physical sciences; the progress of literature, mechanical invention and improvements; the religious statistics of the world, and biographical sketches of the eminent persons deceased in 1862.

NYSTROM'S POCKET-BOOK OF MECHANICAL LAWS. Published by J. B. Lippincott, Philadelphia, and Trubner & Co., London.

This is a compilation of valuable scientific data on every conceivable subject connected with the useful arts. It contains rules, or rather formulas, algebraically expressed, for the solutions of problems and for arriving at definite results in the proportions of machines, &c. Mr. Nystrom, the author, is an engineer of high standing in the profession, and has, from his observations and experience, collected the matter here published as an aid to memory; or, more plainly, for every-day use. The tables are very full, and, from the mathematical reputation of the author, are undoubtedly correct. There is no publication in existence with so complete and reliable formulas, we are assured, of the expansion of steam and its economy, when applied to different kinds of engines, as are to be found in its pages. We have not examined them thoroughly. Water wheels, motors of different kinds and mechanical miscellany of a useful character are condensed into a "pocketable" form, and many men can, by the aid of this little volume, supply themselves with portable knowledge of a very valuable kind. Every person connected with manufactures in general will find this a most desirable work of reference.

THE ATLANTIC MONTHTY FOR APRIL, 1863. Published by Ticknor & Fields, Boston, Mass.

The table of contents exhibits, in this number, an excellent variety. The interesting reminiscences of the poet Keats; the valuable contributions to the stock of popular knowledge concerning the globe we inhabit, by Prof. Agassiz; the narrative of events in the life of the historian Buckle, afford the seeker after entertaining and useful reading a capital field to select from. The article, "A Spasm of Sense," seems, however, to be mis-named. "A Chapter of Platitudes" would be more correct.

THE QUARTERLY MIRROR OF FASHIONS. Published by Madame Demorest, No. 473 Broadway, New York.

The spring number of this publication is now issued, and contains a fine fashion-plate engraving; also numerous other illustrations, which are very finely executed. Even in times of war our ladies seem to wish to keep up with the fashions, and, in order to do this, no better medium than Madame Demorest's *Mirror* can possibly be found. The number is sold for 25 cents.

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ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MARCH 17, 1863.

Reported Officially for the Scientific American.

*** Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

37,891.—Projectile for Rifled Ordnance.—J. B. Atwater, Chicago, Ill.:

I claim, first, The corrugated wire web, or cloth, or its specified equivalent, for the purpose herein described.

Second, I claim, in combination with the wire cloth and head band, the tongued wedges and flanged plungers, arranged in the manner substantially as described.

37,892.—Horse-power.—George E. Burt, Harvard, Mass.:

I claim, first, The projecting boss, r, in combination with the link, a.

Second, I claim the combination of the cog-wheel, f, and the end less platform, arranged in the manner and for the purposes set forth.

Third, I claim the connecting of the links, h h, by the bar, j, for the purpose described.

Fourth, I claim the combination of the link, h, with the supporting rolls and end track, constructed and operating substantially in the manner specified and for the purposes set forth.

37,893.—Knapsack Sling.—D. W. C. Baxter, Philadelphia, Pa.:

I claim, first, The independent knapsack sling or supporter, constructed, arranged and operating in the manner described.

Second, The strips, A A, arranged and operating substantially in the manner described.

87,894.—Stump Extractor.—Thomas Bell, Bellport, and Louis Kulen, New York City:

I claim the bars or teeth, D, in combination with the screw rods, E, the above parts being attached to the frame, C, and the latter placed on a wagon or mounted on wheels in any suitable way, and all arranged to operate as and for the purpose herein set forth.

[This invention is designed for extracting small stumps from the earth, such, for instance, as those of scrub oaks, which, in some sections of the country, are spread over large tracts of land, and which are at present eradicated by hand at considerable expense, so much so as to exceed materially the first cost of the land.]

37,895.—Thrashing Machine.—Edgar M. Birdsall, Penn Yan, N. Y.:

I claim, first, The support, G, when made and used as and for the purpose specified.

Second, I claim the wheels, C D and E, whon arranged as specified and used in combination with the support, G, as set forth.

37,896.—Combined Wash-stand and Water-closet.—Samuel Bissicks, New York City:

I claim the combination and arrangement of the stand, A, or its equivalent, with the bowls, B and C, faucet, I, valve, L, pipes, G and E, and swivel, F, substantially as described.

37,897.—Machine for removing Snow and Ice from Railroads.—Matthew C. Bogia, Philadelphia, Pa.:

I claim the fire-chamber. C, pipes, F and F′, and blower, E, the whole being constructed, arranged on a track and operating substantially as set forth,

37,898.—Machine for rifling Cannon.—Adolphus Bonzano, Detroit, Mich.:

I claim, first, The cutter-head, having its cutters, i i, or stock, to which the said cutters are attached, fitted to grooves, r r, with inclined bottoms, and having applied, in connection with them, a spring, t, and collars, q s, substantially as herein specified.

Second, The employment for producing a regular or progressive twist of the rifle grooves of a barrel, m, connected by a cord or chain with the cutter bar, and geared with the said bar, substantially as herein specified.

37,899.—Lantern.—James K. Breckenridge, West Meriden, Conn.:

I claim the combination of the head of the shaft of the mechanism that controls the wick with an opening in the lantern case, and a receptacle within the lantern; the combination as a whole operating substantially as set forth.

I also claim constructing the receptacle upon the interior of the lantern case with a slot to permit the introduction of the shaft of the mechanism that controls the wick of the lamp, substantially as set forth.

I also claim the combination of the receptacle within the lantern with the shaft of the instrument that acts upon the wick, the whole operating substantially as set forth.

37,900.—Washing Machine.—Adam S. Brown, Lebanon, Pa.:

I claim the combination and arrangement of the slatted rubber, E, concave wash-board, D, jointed arms, H H J J, and rock-shafted, G, substantially as and for the purpose herein described.

37,901.—Liniment.—Edward Conway, Dayton, Ohio:

I claim the production by distillation, from the above-described ingredients, in the above-described amounts and strength; the above-described liniment, for the stopping of blood, the cure of rheumatism, cuts and inflammation of all kinds.

37,902.—Carriage Jack.—George L. Cummings, New York City:

I claim the combination of the eccentric lever, C, with the upright slide rest, D, by which the power to raise the axle is obtained, substantially as described and set forth as above.

37,903.—Water Elevator.—James Daykin, Cleveland, Ohio:

I claim, first, The flat chain (Figs. 3 and 4) when the links are formed by means of the rings or eyes, b b, cross-bar, c, rods, a a, and hooks, d d, arranged and operating substantially as set forth.

Second, I claim the herein-described windlass wheel, C, when constructed as specified, in combination with a flat chain, arranged and operating as specified.

37,904.—Apparatus for nicking Horses.—Hampton Dodge, Buffalo, N. Y.:

I claim, first, The saddle, C, in connection with the metal plate, A, for the purpose herein set forth.

Second, I claim the hinged bar, j, for the purpose specified.

Third, I claim the strap, g, the bar, j, and the crupper bars, H, arranged as and for the purpose herein set forth.

37,905.—Sheep Rack.—James P. Eaton, Manchester, N. H.:

I claim the construction of sheep racks with an elevated walk, A, between them, in combination with the inclined feeders, E E, substantially as herein set forth.

37,905.—Projectile for Fire-arms.—A. H. Emery, New York City:

I claim the construction and arrangement of the hard metallic stay, H, with the soft body of the shot, A, essentially as and for the purposes herein described and set forth.

37,907.—Machine for lasting the Uppers of Boots and Shoes.—Martin R. Ethridge, Bethel, Maine:

I claim the construction of the crimping jaws with "mitered" joints or ends arranged together, substantially as described.

I also claim the combination of a flexible or heel spring presser, E, as described, with the crimping jaws and a toe rest, substantially as specified.

I also claim the peculiar combination for operating or moving the crimping jaws, both toward and from the last, the same consisting in the yoke, M, the cam or cams, N, the springs, g g, and the miter joints, b b b b, the whole being arranged substantially as specified.

I also claim, in combination with the crimping jaws, mechanism substantially as described, for holding the last both at its heel and toe, and mechanism for adjusting it, at either or both ends, vertically with reference to the crimping jaws.

I also claim the combination and arrangement of the elastic cushions, a2 a2, with the crimping jaws, D D.

37,908.—Car Coupling.—John J. Forts, Oshkosh, Wis.:

I claim, first, The construction, application and adjustability of the guard, D d, and the use thereof, in combination with the catch, c, and frame, a a, substantially as set forth.

Second, The application of the arm, e, lever, f, and shaft, g, for the uses and purposes set forth.

37,909.—Machine for arranging Nails for use in Machines for nailing Shoes.—Othniel Gilmore, Raynham, Mass.:

I claim the combination of the impeller or plunger, D, the two inclined planes, A B, the space, C, and the receiver, I, the whole being arranged and to operate substantially as specified. And, in combination therewith, I claim the conduit, H, so constructed and arranged with respect to the space, C, as to enable the reversed nails to be discharged laterally out of the collection in manner as specified.

37,910.—Machine for Miter Dove-tailing.—F. A. Gleason, Rome, N. Y.:

I claim the particular arrangement of cutting tools, by which a miter dove-tail joint, complete in both its parts, *i.e.*, tongue and groove may be cut at any intermediate point between extremes of any piece of lumber; doing the cross-cutting and dove-tailing simultaneously in the same operation.

37,911.—Evaporator for Saccharine Liquids.—James H. Hartwell, Jefferson county, Ind.:

I claim, first, The divided pan, F, in combination with a furnace, also divided as shown, both arranged and operating substantially as described, and for the purpose set forth.

Second, The pan, F, composed of a longitudinally and horizontally divided portion, for the purpose set forth.

Third, I also claim the strainer, B, in combination with the double pan, F, and divided furnace, the whole to form an improved evaporator, as and for the purpose described.

37,912.—Corn Sheller.—Aaron Higley, Warren, Ohio:

I claim the special arrangement of the hopper, B, slide rest, L, arms, N, springs, S, in combination with the toothed cylinder, C, when operating conjointly as and for the purpose set forth.

37,913.—Sewing Machine.—Amasa Bemis Howe, New York City. Patented in England Feb. 8, 1862:

I claim, in combination with the needle-bar box, B B′, the screw, p, and the spring, o, for adjusting and controlling the proper adjustment of said needle-bar box, and the needle bar and needle therein, substantially as described.

I also claim, in combination with the needle, the clip or arm, c, of the lever, c d e f, and the cam, g, for bringing the needle into proper position should it be deflected by any cause, the whole operating in the manner and for the purpose substantially as described.

I also claim the combination of the adjustable needle-bar box, with the clip, e, and its operative parts, substantially as described.

I also claim the arrangement of the compound levers and their action upon and with the feed wheel, as herein described and shown.

37,914.—Automatic Nose-bag.—Gustavus A. Hankinson, Manahocking, N. J.:

I claim suspending the nose-bag in such manner that the natural movements of the horse in feeding will cause the bottom of the bag to approach or recede from his mouth, substantially as described.

37,915.—Beehive.—K. P. Kidder, Burlington, Vt.:

I claim, first, Providing the division plates, E, with cleets, g h, as shown and described, for the purpose of retaining or holding the comb-frames, D, in proper position in the hive, as specified.

Second, The regulator, F, provided with a longitudinal slot, k, two vertical slots, l l′, and a notch, j, combined as shown. The regulator being applied to the bee-entrance, m, by means of the button, G, substantially as and for the purpose herein set forth.

[This invention consists in the employment of division plates or comb-separators placed in the line between the comb-frames, and arranged in such a manner that each comb-frame will be properly retained in position, and also be enclosed within a narrow compartment isolated from those adjoining it, and the bees thereby prevented from building any comb but that in which worker bees are reared. The drone comb being thicker than the worker comb cannot be built within the narrow compartments. The invention also consists in the employment of a regulator constructed and arranged in such a manner that the capacity of the bee entrance may be altered at any time and in different ways, as circumstances may require.]

37,916.—Sugar Evaporator.—John K. Leedy, Bloomington, Ill.:

I claim, first, The water tank, B, constructed in the manner and for the purpose herein specified.

Second, I claim the bottom of the pans arranged in the manner herein set forth, in connection with the rims on which they rest.

Third, I claim the movable reservoir and movable still, as herein fully described.

Fourth, I claim the extension of the side walls of the furnace for the purpose herein described.

37,917.—Mode of elevating Lamp Chimneys.—John G. Leffingwell, Newark, N. J.:

I claim, first, The guides, B, or their equivalent, when attached to the exterior of the burner.

Second, I claim the slides, g, or their equivalent, when attached to the exterior of the gallery and working either on the insides or outsides of guides, B.

37,918.—Preparing a Paint Oil from the Petroleum Residuum.—Adolph Millochau, New York City:

I claim the process, substantially as herein specified, of manufacturing oil adapted to mixing with paints and colors from the acid residuum in the refining of petroleum or coal oils, as set forth.

37,919.—Poncho.—Peter W. Neefus, New York City:

I claim a poncho convertable into a blanket or tent, and having attached to it an air pillow or air pouch, as and for the purpose substantially as described.

37,920.—Combined Wrench, Scraper and Screw-driver.—T. J. Penny, Wooster, Ohio:

I claim, as an improved article of manufacture, a combined wrench, scraper and screw-driver, constructed substantially as herein set forth.

[This invention consists in combining a wrench, scraper and screw-driver all in one implement, so that the latter may be used in any of the above-named capacities, and answer equally as well as if made specially for any of the particular purposes specified.]

37,921.—Securing the Base-pin of Revolving Fire-arms.—Samuel Remington, Ilion, N. Y.:

I claim so constructing the base-pin and arranging the joint of the lever in relation to the base-pin that said joint shall prevent the base-pin from being drawn entirely out of the frame, substantially as herein specified.

37,922.—Foot Corn Planter.—Giles Bolivar Roe, Paine's Point, Ill.:

I claim the combination of the oscillating foot-board, F, with the box, A, plunger, E, spade, C, and plate, D, all in the manner herein shown and described.

[This invention consists in the arrangement of a foot-rest with suitable straps to fasten the foot on the same, in combination with the rising and falling plunger that serves to force the seed from the planter into the ground in such a manner that said plunger can be operated and the planting effected entirely by the action of the foot.]

37,923.—Cattle Pump.—Giles Bolivar Roe, Paine's Point, Ill.:

I claim, first, The drum, C, placed in the well, B, and provided with a valve, D, at its lower end: in combination with the elastic or flexible drum, I, connected with the movable platform, G, and communicating with the drum, C, to operate as and for the purpose set forth.

Second, The combination of the pipes, F K, with the tube, E, arranged as shown, when used in connection with the drums, C I, for the purpose set forth.

Third, The suspended or self-adjusting trough, M, placed on the platform, G, for the purpose herein set forth.

[This invention relates to an improved pump of that class which are designed for raising water for cattle or stock, and to be self acting, that is to say, operated by the cattle while in the act of passing to the trough, or water receptacle, in order to drink.]

37,924.—Rifling Ordnance.—Tecumseh Steece, United States Navy:

I claim a cannon, or other fire-arm, having at its rear end a smooth cylindrical bore, A, and near its muzzle longitudinal or nearly longitudinal grooves, B, which constitute enlargements in the bore, and are separated by lands, b, the ridges or inner surfaces of which lands are in their radial distance from the center equal to the radius of the smooth portion, A, of the bore, all as herein described, so as to guide the projectile during its entire passage through the bore, confine the gases as much as possible until the projectile approaches the muzzle and then permit their escape longitudinally, to impart rotation to the projectile by acting against oblique surfaces thereon, or on a sabot or casting to be used therewith.

[This invention is intended to combine the respective advantages of the smooth-bore and rifled cannon.]

37,925.—Mechanism for starting Sewing Machines.—A. S. Smith, Lockport, N. Y.:

I claim the self-adjusting elongated segment, H, or its equivalent, whose lever is jointed to the frame, in combination with the friction wheel, G, whether said parts are provided with teeth or not, in such a manner that when at rest the segment is raised and removed from the wheel, but that when engaged sufficient motion is imparted to the wheel to throw the crank past the dead point, arranged and operating substantially as herein set forth.

In combination with the segment and its lever, I also claim the adjusting joint, composed of the pivot, f, and slots, g g, or their equivalents, and the coiled spring, L, or its equivalent, for the purpose of allowing a vertical movement to the segment and producing the proper reaction, substantially as and for the purposes herein specified.

37,926.—Camp Stove.—L. H. Smith, Owensville, Ohio:

I claim the construction of a portable stove in flanged sections, A B C, adapted to be extended for use by the elevation of the upper section, A, on legs, F, occupying sockets, E, and when not in use, to be slid within one another in the manner set forth.

37,927.—Machinery for assorting Bristles.—N. H. Spafford. Providence, R. I.:

I claim, first, Automatically conveying the bristles to the feeding belts for the assorting devices preparatory to their being carded and evened up by means of positive mechanical devices, arranged and operating substantially as described.

Second, The arrangement of the box, T, with its sliding plate, Y, and seizing tongues or jaws, so operating together as to first cause the tongues to seize or take a layer of the bristles inserted in the receiving chamber of the machine and then convey them to the belts, l and m, substantially as described.

Third, In combination with the mechanism employed in machines for assorting bristles, the devices hereinabove described, for feeding or conveying the bristles to the same, arranged and operating as set forth.

Fourth, The peculiar arrangement and combination of the cam-shaped wheels, L M, with their rack bars, P Q, connected with the box, T, and its plate, Y, in the manner and operating together as described for the purposes specified.

Fifth, Giving the pinion, a, engaging with the rack bar of the sliding plate, Y, a sufficient rotary motion while the box, T, is being turned upon its shaft, R, as a center, so as to prevent a leverage upon the same by the said bar and thus obviate friction and binding of the parts, substantially as described.

Sixth, Imparting to the bristles contained in the receiving chamber, a motion in the proper direction, by means of a pawl, w, and ratchet wheel, v, the said pawl being arranged and operating in connection therewith, substantially in the manner and by the devices described.

Seventh, The use of the vertical separator, i, for piercing and separating the bristles in their receiving chamber, arranged and operating as described.

Eighth, The forked swinging plate, I, so arranged and operated that while it prevents the escape of the bristles from the receiving chamber it will yet allow of the easy removal of the same by the devices described.

Ninth, The combination of the lever, n, loose tongue, e, of the sliding plate, y, and projecting rod or arm, q, of the driving shaft, arranged together and operating in the manner and for the purpose specified.

Tenth, automatically drawing out or taking the bristles from the machine, according to their respective lengths, and thus assorting the same by means of a series of nippers or any suitable seizing devices operating substantially as described.

Eleventh, The combination of the traveling platform, k′, studs, f″ f″, &c., and nippers, n′ n′, &c., so arranged and operating together as to open and close the said nippers, and to both seize the bristles and deposit them in boxes at the proper times, substantially as described.

Twelfth, The arrangement of the horizontal trip rod, S″, having a reciprocating rectilinear movement at regular intervals of time, imparted to the same by any proper means, and operating substantially as described and for the purposes specified.

Thirteenth, The combination of the trip rod, s″, inclined lever, v″, and cam-shaped grooved sector or drum, y″, operating together, as described.

37,928.—Lamp.—W. G. Sterling, Bridgeport, Conn.:

I claim, first, The skeleton bridge spreader, G, constructed as herein described, when the same is combined with the wick tube and isolated from this tube and the lamp cap, by means of a non-conducting medium, substantially as described.

Second, Securing the bridge-holding cap, c, to the wick tube by means of a non-conducting cement substantially as herein described.

Third, Pivoting the skeleton bridge, G, or its equivalent to an isolated cap, c, as and for the purposes herein described.

Fourth, The stops, e e, on cap, c, in combination with the pivoted bridge, G, substantially as described.

Fifth, Constructing the open or skeleton bridge, G, of one piece of metal stamped out so as to form the pivot holes, openings, k k, portions, l l, and arched bridges, n n, as described.

37,929.—Pipe Coupling.—S. R. Warner, New Haven, Conn.:

I claim the combination and arrangement described of the rings, A A, clamps, E, and forcing ring, F, in the manner and for the purpose substantially as herein specified.

37,930.—Coal-oil Burner for Lamps.—J. T. Vankirk, Philadelphia, Pa.:

I claim, first, The case, B, with the dome or deflector, G, connected permanently to the same, when combined with and rendered detachable from the case, A, substantially as and for the purpose herein set forth.

Second, So constructing and arranging the perforated cases, A and B, that an annular space shall intervene between the two for the purpose specified.

37,931.—Sewing Machine.—William Weitling, New York City:

First, I claim a double-thread holder operating in such a manner as to cross its two threads alternately to the right and to the left and having a reciprocating motion to and from the needle or needles of a sewing machine, substantially in the manner and for the purpose herein described.

Second, I also claim, in combination with a sewing mechanism provided with a thread-carrier operating through the opening of the button hole, a double-thread holder operating in such a manner as to cross its two threads alternately to the right and left, and having a reciprocating motion to carry the crossed threads to and under the needle and vertical thread-carrier, c, substantially in the manner and for the purpose described.

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Third, I claim a thread-holder consisting of a pair of levers moving on a common fulcrum toward and from the needle or needles and having also a crossing motion of its arms whose ends, e′ and e″, are each provided with an eye or thread leader for the passage of thread, as herein described and for the purpose set forth.

Fourth, I claim the combination of a shifting double-thread holder and a thread-carrier with a sewing mechanism, substantially as herein described and for the purpose set forth.

Fifth, I claim securing the thread-holder plate, b, to the angular supporter, q, by means of double hinges, i′ and i″, so to raise or lower the double-thread holders, e′ and e″, at pleasure, substantially in the manner and for the purpose described.

Sixth, I claim the button-hole guide consisting of the two pins, o′ and o″, whether attached to the bedplate or to the cloth-presser, when the same are constructed and operated substantially in the manner and for the purpose described.

37,932.—Mowing Machine.—James E. Wood, Worcester, Mass. :

I claim the combination of the arm, p, and the cam, q, or their mechanical equivalent or equivalents with the auxiliary wheel, m, its operative lever, and the cutter bar, G, hinged or applied to the frame, A, or the supporting part, i, thereof, substantially in the manner and so as to operate as described, the said appliances to the cutter bar and its supporter constituting what may be termed a duplex motion or mechanism, by the aid of which such cutter bar may be elevated or raised off the ground and above the same with great celerity when the mowing machine may be in use.

37,933.—Grate.—William Wright, South River, N. J. :

I claim a fire grate for furnaces constructed of a series of independent sliding bars, C, fitted in bearing plates, B, and extending through the front of the furnace, substantially as set forth.

[The object of this invention is to obtain a grate for furnaces which will admit of being cleaned with far greater facility than usual, without exposing the operator to the heat or dust attending the operation and without admitting any cold air into the furnace.]

27,934.—Skate.—J. M. Yates, Fultonville, N. Y. :

I claim, first, constructing the toe and heel plates, B and D, and runner, A, all in one piece, by turning and bending over the ends of the runner and flattening the same, as set forth, in combination with the springs, C E, attached to the plates, B D, and resting on the runner, A, as set forth.

Second, Attaching the screw or heel spur, F, to a thumb plate, G, the latter having a slot made in it to allow the heel strap, H, to pass through, and the former being allowed to turn in the plate, D, substantially as and for the purpose specified.

[This invention relates to a skate in which springs are employed to admit of a certain degree of elasticity between the foot of the wearer and the runner of the skate, and consists in having the sole plate of the skate formed of two parts, to wit, a heel piece and a toe piece, which are constructed out of the same piece of metal as the runner, and in such a manner as to have a spring connection with it, said heel and toe pieces being also supported by springs, whereby the desired elasticity is obtained. The invention also consists in having the screw or heel spur of the skate attached to a button or revolving thumb plate, which is slotted to admit of the heel strap passing through it, whereby a proper bearing is obtained for the heel strap and the screw or spur rendered capable of being secured directly into the heel, in adjusting the skate to the boot or shoe, without the aid of a gimblet or without turning the skate as hitherto required.]

37,935.—Operating Ordnance.—M. L. Callender, New York City, and N. W. Northrup, Greene, N. Y., assignors to J. B. Eads, St. Louis, Mo. :

We claim the construction and arrangement of the gun, platform, and shield, so that it may be freely revolved while supported on a cushion of steam within the cylinder, as described.

Second, We claim the method of transmitting steam pressure to either or both sides of the trunnions without interfering with the free rotation of the platform and shield, substantially as described.

37,936.—Knapsack.—A. N. Clark (assignor to the Rubber Clothing Co.), Boston, Mass. :

I claim the combination with shoulder straps radiating from an adjustable center strap, as described, of guides or loops fixed to the upper side of the knapsack, the whole being arranged together and operating substantially as described and for the purposes specified.

37,937.—Breech-loading Fire-arm.—Charles Jackson and Thos. Goodrem (assignors to Charles Jackson), Providence, R. I. :

We claim, first, The stop, E, arranged on a pivot, d, in such a manner, in combination with the barrel and breech and with a screw, b, or its equivalent, as to serve as a stop in both the opening and closing movements of the barrel, but so as to permit, when desired, the unscrewing of the barrel far enough to detach it from the breech, substantially as herein specified.

Second, The plate, h, attached firmly to the breech and applied in combination with the screw, D, to produce both a rotary and a longitudinal motion of the cartridge cases for the purpose of withdrawing them from the barrel, substantially as herein specified.

37,938.—Preparation of Aniline Blue.—Prosper Monnet, Lyons, France, assignor to Schneider & Heidlauff, New York City :

I claim the within-described process of producing the blue of rosaniline by treating pure rosanline with acetate of aniline, substantially in the manner herein described.

[By this simple process the blue color can be produced from aniline in an easy and expeditious manner. The patent has been assigned in full to Messrs. Schneider & Heidlauff, 21 South William street, New York, and further information in regard to it and to M. Monnet's previous patents can be obtained through those parties.]

37,939.—Plow.—S. J. Olmstead (assignor to himself, W. S. Weed and D. S. Ayres), Binghamton, N. Y. :

I claim, first, The attachment of a wheel upon the landside, forming a large part thereof and projecting below the bottom of the plow, while its exterior or outer surface is in line with the landside, for the purpose of removing the friction of the plow while at work, as set forth.

Second, I claim making the supporting arm, e, of the wheel a part of the mold-board casting.

37,940.—War Rocket.—Pascal Plant (assignor to himself and Rufus Waples), Washington, D. C. :

I claim, first, The pressing of the rocket composition around the case of the powder magazine, forming a cylinder of less circumference than the interior of the outer case, that the gas may pass through the annular space to the holes in front, and thence pass to the cap pieces.

Second, One or more conical cap pieces of less diameter than the body of the projectile to give direction to the gas from the burning composition, constructed and operating substantially as and for the purposes described.

37,941.—Ring for Martingales.—W. M. Welling, New York City, assignor to S. G. Welling, New Rochelle, N. Y.:

I claim the ring for martingales, &c., manufactured as set forth, with a metal ring enveloped in composition, as and for the purposes specified.

37,942.—Submarine Battery.—Benjamin F. Smith, Jr., Albany. N. Y. Antedated Nov. 15, 1862 :

I claim the application to and combination with vessels of otherwise ordinary or suitable construction, of a mechanism for driving or thrusting shells or other explosive missiles against vessels or other bodies accessible by water and there by contact to explode, said mechanism being constructed and arranged to operate substantially in the manner herein set forth.

RE-ISSUES.

1,431.—Car Spring.—Augustus B. Davis, Philadelphia, Pa. Patented Feb. 15, 1859. Re-issued Jan. 6, 1863 :

I claim, first, A box of any suitable form and a plate, C, or its equivalent, adapted to the open end of the said box, and connected to the latter by a bolt or bolts, D, or other suitable fastenings, substantially as set forth, in combination with a series or nest of springs arranged side by side, and free from contact with each other, each spring forming an integral part of the entire elastic medium composed of the whole of the springs, and the latter serving with the said box and plate to constitute an entire single self-contained car spring as described.

Second, The use within a box substantially as described of a series or nest of epiral or coiled springs when made of iron-wire, and treated by compression or impact prior to being deposited in the box as set forth for the purpose specified.

Third, The series or nest of springs combined with a box and plate so constructed that the compression of the said springs shall be limited and their constant availability thereby preserved.

1,432.—Elastic Cap for sealing Cans and Bottles.—Thos. R. Hartell & John Letchworth, Philadelphia, Pa., assignees by mesne-assignments of Rhoda Davis, late of Brookhaven, N. Y. Patented Feb. 24, 1857 :

We claim a rigid plate, B, of metal or other suitable material having a web or band of gum elastic so formed and arranged that when applied to a jar or other tubular object, the web or band will be stretched, and tending to return to its original form and dimensions will with the said plate hermetically seal the jar as set forth.

1,433.—Cream Pump.—M. A. Richardson, Sherman, N. Y. Patented Sept. 23, 1862 :

I claim the use of a screen or screens, K, within or closing the discharge outlet of a force pump, for the purpose of breaking the tenacious and hardened portions of cream, arranged and operating substantially as herein set forth.

4,434.—Grain-dryer.—Samuel Schuyler, Brooklyn, N. Y. Patented Jan. 22, 1861 :

I claim, first, So combining the several screens or platforms, B B, by means of chains and pulleys or other equivalent devices for adjusting their elevation, that all may be simultaneously raised or lowered at one end for the purpose of adjusting or varying their inclinations substantially as and for the purpose herein specified.

Second, The combination of the series of platforms, B B, with the elevator, M, or its equivalent substantially as and for the purpose herein set forth.

1,435.—Composition for Blasting Powder.—W. R. Thomas & M. Emanuel, Jr., Catasauqua, Pa. Patented April 9, 1861 :

We claim; first, A powder intended principally for blasting purposes, in which nitrate of soda is substituted for the nitrate of potash and the tendency of that salt to attract moisture is prevented by the use of ground bark or its equivalent instead of charcoal, substantially as above described.

Second, We claim a powder intended principally for blasting purposes composed of sulphur, nitrate of soda and ground bark or its equivalent, prepared substantially as above described.

1,436.—Blasting Powder.—W. R. Thomas & Morgan Emanuel, Jr., Catasauqua, Pa. Patented March 11, 1862 :

We claim, first, The use of chlorate of potash with nitrate of soda and ground bark or its equivalent in the formation of an explosive powder, substantially as above set forth.

Second, An explosive powder compounded of nitrate of soda, sulphur, chlorate of potash and ground bark or its equivalent, substantially in the manner and for the purpose above set forth.

1,437.—Blasting Powder.—W. R. Thomas & Morgan Emanuel, Jr., Catasauqua, Pa. Patented Dec. 9, 1862 :

We claim, first, In a blasting compound in which nitrate of soda and ground bark or its equivalent are used as two of the ingredients, we claim the use of starch as another ingredient, when combined and compounded with the other substances, substantially as described.

Second, In a blasting compound in which nitrate of soda, chlorate of potash and ground bark, or its equivalent are used, as ingredients; we claim the use of starch, as an additional ingredient, in the manner and for the purpose described.

Third, We claim the use of nitrate of soda, flowers of sulphur, chlorate of potash, starch, and ground bark, or its equivalent, when combined and compounded substantially in the manner and for the purpose above described.

1,438.—Cheese Vat.—C. M. Wilkins, West Andover, Ohio. Patented Nov. 22, 1859. Re-issued Dec. 24, 1861 :

I claim, first, The combination of the pipe, w, with the heater, F, substantially as and for the purpose specified.

Second, The combination of the valve, o, with the pipe, w, for the purpose set forth.

Third, The combination of the valve, N, with the pipe, B, over the fire-box, C, of the heater, substantially as and for the purpose specified.

Fourth, Arranging the valves, N and O, to operate substantially as described, and for the purpose specified.

Fifth, Arranging the heater, F, as relating to the water vat, A, and reservoir, L, substantially as shown, and for reasons specified.

Sixth, I claim the use of the truss braces, J J J, in the manner and for the purpose described and shown.

1,439.—Railroad Car Seats and Couches.—Theodore T. Woodruff, Philadelphia, Pa. Patented Dec. 2, 1856 :

I claim connecting and combining the two opposite sets of cross seats of a railroad car with additional frames to form the required length of cushioned surfaces to form couches in each compartment, substantially as described.

And I also claim, combining and connecting the backs of opposite cross seats of a railroad car, when elevated to a horizontal position to constitute an elevated couch or couches, substantially as described.

And I also claim combining with the backs additional frames, substantially as described, to form the required length of couch, and thereby avoid the necessity of making the backs of an inconvenient height when used as backs to the seats.

And I also claim the connecting the backs of opposite cross seats when elevated to a horizontal position to form an elevated couch or conches, substantially as described, in combination with the opposite cross seats arranged so as to be convertible into conches, substantially as described.

And I also claim forming an elevated couch, above the couch formed by the backs of seats, by a series of hinged frames, substantially as described.

EXTENSIONS.

Re-issue 758.—Cut-off and Working Valve of Steam Engines.—George H. Corliss, Providence, R. I. Patented March 10, 1849 (No. 6,162). Re-issued May 13, 1851; again re-issued July 12, 1859 :

I claim the method substantially as described of operating the slide valves of steam engines, by connecting the valves that open and close the ports at opposite ends of the cylinder, with separate crank wrists or their mechanical equivalents, so that from the motion thereof each valve while its port is closed, shall move a less distance than it moves in opening and closing its port while at the same time the two wrists by which the two valves are operated have the same range of motion as described; whereby I am enabled to save much of the power heretofore expended in working the slide valves of steam engines, and by which also I am enabled to make a greater proportion of the movement of the valve available, for effecting a free passage of the steam through the ports of the cylinder.

Re-issue 759.—Cut-off and Working Valve of Steam Engines.—George H. Corliss, Providence, R. I. Patented March 10, 1849 (No. 6,162). Re-issued May 13, 1851; again re-issued July 12, 1859 :

I claim the combination of liberating valve gear with valves which are moved parallel to their seats and continue their closing motion after their ports are closed, and commence their opening motion before their ports open, substantially as described.

Re-issue 760.—Cut-off and Working Valve of Steam Engines.—George H. Corliss, Providence, R. I. Patented March 10, 1849 (No. 6,162). Re-issued May 13, 1851; again re-issued July 12, 1859 :

I claim the combination substantially as described, of an air cushsion with the liberating valve gear of steam engines.

Re-issue 761.—Cut-off and Working Valve of Steam Engines.—George H. Corliss, Providence, R. I. Patented March 10, 1848 (No. 6,162). Re-issued May 13, 1851; again re-issued July 12, 1859 :

I claim the combination with the part of the valve gear that appertains to a liberated steam valve, of an instrument moved by the power of the engine in such manner as to effect the closing of the liberated valve, whenever the independent means provided for that purpose fail to act in time.

Re-issue 762.—Cut-off and Working Valve of Steam Engines.—George H. Corliss, Providence, R. I. Patented March 10, 1849 (No. 6,162). Re-issued May 13, 1851; again re-issued July 12, 1859 :

I claim the combination of a helical cam with the opening and closing mechanism of the steam valve substantially as described.

Re-issue 763.—Cut-off and Working Valve of Steam Engines.—George H. Corliss, Providence, R. I. Patented March 10, 1849 (No. 6,162). Re-issued May 13, 1851; again re-issued July 12, 1859 :

I claim the method substantially as described for regulating the velocity of steam engines, by combining a regulator with a liberating valve gear.

6,161.—Machine for cutting Teeth of Beveled Gear.—George H. Corliss, Providence, R. I. Patented March 10, 1849 :

I claim, first, The method of cutting the cogs of beveled wheels by means of a reciprocating cutter that moves in or on a slide (or slides) that vibrates on an axis that coincides, or nearly so, with the apex of a cone representing the bevel of the wheel to be cut, substantially as herein described, by which vibration the depth of cut is determined and this I claim irrespective of the adjustment of the axis of vibration as described.

Second, I claim the guide bar (or its equivalent), on which the cutter carriage runs, and having its axis of vibration for the depth of cut as above described when combined with a secondary frame jointed to the main frame at some point outside of the circumference of the wheel to be cut, that the machinery may be adapted to the cutting of cogs on various bevels, substantially as described.

Third, I claim in combination with the guide bar having an universal joint or the equivalent thereof and operated substantially as described in combination with the guide-plate to guide the cutter and determine the frame of the face of the cogs, as described.

Fourth, I claim making that part of the guide bar which rests against the guide plate to determine the form of the face of the cogs separate from and movable on the guide bar and properly beveled to relieve and clear the cutter for its back movement, substantially as described.

6,209.—Adjustable Cut-off.—Julius King, Bordentown, N. J. Patented March 20, 1849 :

I claim raising the valves by means of the tappets of a revolving shaft, acting against the adjustable sliding feet of horizontal vibrating levers which raise the valves, whereby the steam can be cut off at any point in the stroke of the piston that may be desired and the points of cutting it off changed from time to time without stopping the engine. I desire it to be understood that I do not limit myself to the precise arrangement of parts herein represented, but claim the right of varying the same to any extent that may be deemed advisable while I accomplish the same results by essentially analogous means:

I likewise claim reversing the motion of the engine by means of the clutch coupling arranged and operated substantially as herein set forth, and also by the same means throwing the chain which operates the valves out of gear, when it is required to work by hand.

DESIGNS.

1,734.—Solitaire Board.—James A. Bazine, Canton, Mass.

1,735.—Plate of a Stove.—E. J. Cridge, Troy, N. Y.

1,736.—Skate.—Frank Douglass, Norwich, Conn.

1,737.—Floor Oil-cloth.—George Green, Wappingers Falls, N. Y., assignor to Deborah Powers, Albert E. Powers & Nathaniel B. Powers, Lansingburgh, N. Y.

1,738.—Clock Case.—George B. Owen, New York City.

1,739.—Floor Oil-cloth.—James Paterson, Elizabeth, N. J., assignor to Deborah Powers, Albert E. Powers & Nathaniel B. Powers, Lansingburgh, N. Y.

TO OUR READERS.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents when two good drawings are all that is required to accompany the petition, specification and oath, except the Government fee.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides, covered with marble paper and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we shall commence on the expiration of this present volume to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style will be 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, 37 Park Row, New York.

Back Numbers and Volumes of the Scientific American

VOLUMES I., II., III., IV., V. AND VII. (NEW SERIES) complete (bound or unbound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which include postage. Price, in sheets, $1 50. Every mechanic, inventor or artizan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. Nearly all the numbers of VOL. VI. are out of print and cannot be supplied.

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IMPORTANT TO INVENTORS.

PATENTS FOR SEVENTEEN YEARS.

MESSRS. MUNN & CO., PROPRIETORS OF THE SCIENTIFIC AMERICAN, continue to solicit patents in the United States and all foreign countries, on the most reasonable terms. They also attend to various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court. Interferences, Opinions relative to Infringements, &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent free of charge. Address MUNN & CO., No. 37 Park Row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands such examinations have been made through this office. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank-bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

The revised Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the Government fee required on filing an application for a patent is *reduced* from **$30** down to **$15.** Other changes in the fees are also made as follows —

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (but in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

During the last seventeen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the inventors throughout the country, we would state that we have acted as agents for at least TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees at home and abroad. Thousands of inventors for whom we have taken out patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the inventors whose patents were secured through this office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive offices, and we are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat, under the new law, is $10. A pamphlet of advice regarding applications for patents and caveats, printed in English and German, is furnished gratis on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

Assignments of patents, and agreements between patentees and manufacturers are carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row New York.

It would require many columns to detail all the ways in which inventors or patentees may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of patentees will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief story of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through the Scientific American Patent Agency, No. 37 Park Row, New York.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency, the requirements of different Government Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park Row, New York, or any of our branch offices.

Home Queries

J. K., of N. B.—At the time when postage-stamps were used as a currency many soiled ones were improperly used to pay postage on letters. The gathering-up of stamps that had been used became quite a business, and the Post-office Department was defrauded to a large extent. We understand from the Post-master that since the introduction of postal currency there is now no such need of a stamp-canceler as heretofore existed.

E. C. P., of N. Y.—The sample of fiber which you have forwarded to us is beautiful and silky, but not sufficiently strong to work into durable goods. You should make experiments to determine whether it can be spun into yarn and made into suitable fabrics. This is the only way to find out whether it can be used as a passable substitute for cotton. It seems to us that it might be mixed with cotton and would produce a soft and beautiful fabric.

G. C. H., of Pa.—A good index-plate is a very difficult thing to obtain. All shops profess to have the best. We have been told that the Novelty Iron Works, in this city, have the most correct ones in the country.

J. W., of Mo.—So far as we know, there is no special work published on the hatching of eggs and the raising of chickens.

J. B., of N. H.—Smoke-consuming furnaces are not required where anthracite fuel is used for boilers, but west of the Alleghanies, where bituminous coal is the common fuel, a good smoke-consuming arrangement is much wanted. In England, as you state, the smoke must be consumed, according to an act of Parliament, and it may pay you to go over and examine the smoke-consuming arrangements in that country, but we cannot decide this question for you.

J. D. W., of D. C.—Write to Captain Ericsson, of this city, if you desire to buy his engines. We are not agents for the sale of any machinery.

J. A. W., of Maine.—We stated that while no springs were found on the very highest point of a mountain many were found at lower elevations. Your statement that springs are found fifty feet below the summit of Mount Washington confirms our views as to the sources of rivers. The most perfect confirmation of the theory that rains and snows supply our springs, streams and rivers, is the fact that mountain streams almost cease during long droughts. All mountain ranges contain caverns and rocky recesses filled with water derived from rains and melted snows.

D. A. C., of Minn.—The specimen of ore which you have sent us contain but a small amount of copper; much richer ores however, may be found in the vicinity where they were obtained You should select some of the richest samples and obtain a quantitative analysis of them.

J. W. D., of Mass.—Gelatine is pure glue. Perhaps the Italian image-makers employ it for molds in casting plaster figures as described on page 386, Vol. I of "Ure's Dictionary of Arts and Manufactures." The same method may be applicable to your purpose.

B. H. McN., of Ohio.—You will find the article describing how a dead black is produced on brass, on page 182, Vol. VII (new series of the SCIENTIFIC AMERICAN.

E. J. S., of Mass.—There is no provision in our patent laws which requires a patentee to put his invention into use within a certain time, except in the case of a foreigner.

C. C., of Ind.—Messrs. Todd & Rafferty, of Paterson, N. J., manufacture all kinds of machinery. They have enough orders now on hand to keep them busy for six months.

H. C. B., of Pa.—The copper deposited in a galvanic battery from a copper solution is the kind referred to as used for bronzing the cast-iron facade in Paris. All that is known of the process is given on page 171, current volume of the SCIENTIFIC AMERICAN.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, March 18, to Wednesday, March 25, 1863:—

W. C. H., of Ohio, $25; C. E. H., of Mass., $250; I. P. T., of N.Y., $360; L. D. C., of Mich., $41; J. B., Jr., of Mass., $25; G. E. S., of Iowa, $15; L. W. P., of Mass., $29; W. H. B., of N. Y., $25; D. H. P., of Conn., $16; G. J., of N. Y., $25; R. P. M., of Mich., $30; C. D. R., of Ill., $10; J. A. McC., of Ky., $20; W. M. D., of N. Y., $16; H. N., of N. Y., $16; W. F. G., of Ohio, $36; K. & M., of N. Y., $15; S. H., of N. Y., $20; S. E. T., of N. J., $41; L. R., of N.Y., $20; W. & P., of N. Y., $25; T. J. D., of N. Y., $41; F. A. De M., of N.Y., $26; W. J. G., of Ohio, $25; W. B., of Pa., $41; W. & P., of Mass., $15; N. S., of Ind., $15; G. M., of Vt., $16; J. S., of Mich., $16; E. H., of Mass., $41; H. B. & G. A. M., of Mich., $26; L. D., of N. Y., $16; R. C., of N., $29; G. B. I., of Vt., $16; S. C. P., of Mass., $10; W. W. W., of Conn., $20; C. H. M., of N. Y., $45; J. F. B., of Wis., $20; N. A. B., of N. Y., $41; G. E., of N. Y., $16; Q. & L., of Del., $20; D. H., of N. Y., $16; W. T. E., of N. J., $20; H. C. D., of C. W., $25; M. V. B. W., of Ill., $16; S. L. F., of Mass., $15; C. E. S., of Conn. $15; J. A. C., of N. Y., $296; G. C., of N. Y., $15; H. P. A., of Mass., $30; T. W., of Ill., $16; E. P. M., of Mass., $25; G. D., of Pa., $16; M. C. E., of N. Y., $16; T. N. D., of Ind., $20; C. & T., of Conn., $16; A. B., of Mo., $20; E. L., of N. Y., $20; S. J. S., of N. Y., $20; R. J. M., of N. Y., $46; T. S. D., of N. J., $22; M. & B., of Ill., $20; G. F. I. C., of N. J., $16; H. D., of N.Y., $20; W. B., of Pa., $26.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, and inform us the amount, and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Wednesday, March 18, to Wednesday, March 25, 1863:—

N. A. B., of N. Y.; R. J. M., of N. Y.; T. S. D., of N. J.; H. L., of N. Y.; T. J. D., of N. Y.; F. A. DeM., of N. Y.; A. M., of Pa.; D. P. M., of Mass.; J. A. McC., of Ky.; G. J., of N. Y.; T. H. A., of Ill.; L. W. P., of Mass.; C. C., of N. Y.; W. H. B., of N. Y.; T. J. McG., of Ohio; H. B. and G. A. M., of Mich.; J. McL., of Ohio; C. O. F., of Maine; F. and K., of Cal. (2 cases); J. W., of Ill. (2 cases); W. J. S., of Ohio; J. B. Jr., of Mass.; W. B., of Pa.; W. C. H. of Ohio.

RATES OF ADVERTISING.

Twenty-five Cents per line for each and every insertion, payable in advance. To enable all to understand how to compute the amount they must send in when they wish advertisements inserted, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

PAYE'S PATENT FORGE HAMMER.—THIS HAMMER is adapted to both heavy and light forgings; the force of the blow being entirely at the will of the operator, and for all forgings under six inches, both round or square, is the best hammer now in use, and requires but one-half the power used by every other hammer to do the same work. For an engraving and description of this hammer see page 1, Vol. V. (new series) of the SCIENTIFIC AMERICAN; some valuable improvements have, however, been since made. All communications should be addressed to H. M. AMES, Box 422, New York, or Ames Iron Works, Oswego, N. Y. These hammers may be seen in operation at the Allaire, Neptune, Secor, Delamater, Fletcher & Harrison, Duncan & Crampton, Anderson & McLaren, Duhurst & Emerson, Charles T. Porter, Hudson River Railroad Car Shop, all in New York city; Joseph Colwell, Jersey City; Wm. White, Newark, N. J.; Providence (R. I.) Tool Co.; Whiting & Wilcox, Kaighn's Point, Phila.; Mallory & Cottrell, Mystic, Conn.; J. Dillion, Rondout; James Horner & Co., Sing Sing; Henry Esler & Co., Brooklyn; James B. Eads, St. Louis, Mo.; Franklin Iron Works, Central Railroad Shop, Albany; Burlington, Quincy & Chicago Railroad Shop, Ames Iron Works, Oswego; C. P. & A. Railroad Shop, Cleveland, Ohio. 1*

TRIP HAMMERS.—WE ARE MANUFACTURING Howell's Patent Trip Hammers (illustrated in No. 2, Vol III., new series, SCIENTIFIC AMERICAN) to which the attention of those interested is invited. Descriptive circular and references to those who have them in use mailed to all applicants. JAMES L. HAVEN & CO., Nos. 173, 175 and 177 West Second street, Cincinnati, Ohio. 14 6*

INDICATORS FOR ASCERTAINING THE WORKING horse-power of steam engines for sale; also steam and water gages, glass tubes, patent gage cocks, whistles, engine-counters, heat gages and signal gongs for steamboats. E. BROWN, 311 Walnut street, Philadelphia, Pa. 1*

CLOUGH & BURRELL'S PATENT FIRE-CRACKER Torpedo and Parlor Gun.—This device is intended as a toy gun, and an instrument of practice in acquiring the art of shooting. The best and most saleable article for boys and girls' enjoyment of anything ever offered the trade. Price $15 per gross; fancy striped $18. All orders must be addressed to S. R. BURRELL, 71 Broad street, or o I. S. CLOUGH, 290 Pearl street, New York. 14 4*

ELECTRO-MAGNETIC WATCH-CLOCK COMPANY.—Hamblet's Patent—at 47 Hanover street, Boston, Mass. Orders and correspondence responded to by EDMANDS & HAMBLET. 14 4*

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability and economy with the minimum of weight and price. They are widely and favorably known, more than 200 being in use. All warranted satisfactory or no sale. A large stock on hand ready for immediate application. Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 14 13

LABORATORY OF INDUSTRIAL CHEMISTRY.—Advice and consultations on chemistry applied to arts, manufactures, agriculture, &c. Processes of chemical fabricatures, plans and drawings of factories and apparatus. Analysis and commercial essays in general. Address Prof. H. DUSSAUCE, Chemist, New Lebanon, N. Y. 14 2*

J. E. STEVENSON, THE NOVELTY IRON WORKS, New York, agent for the purchase of Mill and Factory Machinery, Steam Engines, Tools, &c. All orders intrusted to his care will be promptly attended to. 14 eow6*

AMERICAN SHARP-SHOOTER.—MY FIRST EDITION being about exhausted, I am now prepared to furnish copies at *only twenty-five cents* each, by mail, free of postage. I do this that the importance of the work may be realized by every person, whether a sportsman or soldier, and that each may have a copy. Address DANIEL WOOD, Publisher, Rochester, N. Y. 1*

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THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline publish.

For further particulars, address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
New York City.

"INVENTORS' EXCHANGE."—309 REGENT STREET, Polytechnic Institute Building, London, England. Established for negotiating the sale of Patents, and for the sale and exhibition of Patented Articles. The Polytechnic Institute is the headquarters of scientific men, Regent street is London's principal thoroughfare, and the "Inventors' Exchange" offers unusual facilities for negotiating Patent Rights to the best advantage. The sales room fronts on Regent street, has plate-glass front and side, is 20 by 60 feet in dimensions, 13 feet high, forming one of the most attractive show-rooms in the metropolis. American inventors having articles of merit patented in Great Britain, are invited to correspond with CHARLES P. BUTTON, Proprietor of the "Inventors' Exchange," London, England. Refers to S. M. Pettingill & Co., 37 Park Row, and Julius R. Pomeroy, 192 Broadway, New York. 14 8*

NOTICE TO LUMBERMEN—FOR SALE—THE PLANing Mill Machinery and Real Estate of the late James P. Barth, deceased. This property is situated in the village of Clyde, Wayne Co., N. Y., directly on the Erie Canal and 40 rods from the New York Central Railroad—is the only establishment of the kind in the town or vicinity. Clyde is the most flourishing village in Wayne county. The property consists of land sufficient to pile one million feet of lumber—spacious sheds and buildings—a powerful steam engine—one 14-inch Woodworth planing, tonguing and grooving machine—one 24-inch improved Norcross surfacer—panel, siding and edging saws—shafting, belting, &c.; all in good running order, and been in use only since July, 1860. For sale on account of death of owner. Price, $7,000. Address ANDREW C. BARTH, Newark, Wayne Co., N. Y. 14 2*

GUTTA-PERCHA CEMENT ROOFING.—THIS ARTICLE has been thoroughly tested for nearly seven years, and we have more than three thousand certificates relative to its merits. It is fire and water-proof; costs only about one-third as much as tin, and is more durable; can be applied by ordinary laborers at a trifling expense. Liquid Gutta-percha Cement for coating and preserving metal roofs, and for repairing leaky roofs of all kinds. These materials are shipped ready for use (no heat required). Full descriptive circulars, prices, &c., furnished by the JOHNS & CROSLEY MANUFACTURING COMPANY (sole manufacturers), 78 William street, corner of Liberty, New York. 14 4*

A CHALLENGE TO A TEST TRIAL OF THE BEST washing machine now in use is respectfully given by the undersigned to every proprietor of that kind of machine in the United States. That he can wash more clothes in less time, wash them better, with more ease to the operator and less injury to the clothes. Will accede to any equitable terms, time, place, or manner within my power. Patented Jan. 6, 1863. Rights for sale. Address JOHN T. BEVER, Springfield, Ill. 14 2*

GANG PLOW WANTED—SUITABLE FOR PRAIRIE soil after once broken up. Address B. ROSE, Cleveland, Ohio, with description and price. 13 2*

VALUABLE MANUFACTURING ESTABLISHMENT FOR SALE—Located near the Westport Depot on the New York and New Haven Railroad. The factory is a brick building about 100 by 60 feet, with a beam engine of 150 horse-power, and of the most approved construction. The factory is located by the side of the channel of the Saugatuck river, below the railroad bridge, and has a water front, where vessels can lay at any stage of water, while the distance to the railroad depot is not over 20 rods. The property will be sold cheap, either with or without the engine. No more desirable location for manufacturing with economy can be found in the country. For particulars, inquire of P. T. BARNUM, at the American Museum, New York, or of WILLIAM D. BISHOP, Bridgeport, Conn. 13 4*

TO GAS AND FLUID METER MANUFACTURERS.—Improved Self-computing Register for Gas and Fluid Meters. Patented March 3, 1863, by John J. Squire, of Windsor Locks (late of New Haven, Conn. Effectually obviates all difficulty in computing a correct registry of measurement—is applicable to the common movement—simple and thoroughly practical. A correct meter with this improvement renders all difference between producers and consumers impossible. Patent Rights for sale or lease. Address JOHN J. SQUIRE, Windsor Locks, Conn. 13 2*

INCRUSTATION IN BOILERS—A SURE REMEDY—**WINAN'S ANTI-INCRUSTATION POWDER.**—Seven years in successful use, without injury. This should give it preference over new and unknown mixtures lately put in the market References: In New York, American Bank Note Co.; in Cincinnati, Miles Greenwood; and over 1,000 others throughout the country. Apply for circulars to H. N. WINANS, Box 6, P. O., New York City. 13 4.

FOR SALE.—A 45 HORSE-POWER ENGINE, WITH two boilers, 3½ by 32 feet, each with two 13-inch flues, pump and all the fittings, nearly new; one 10 horse-power engine, with a flue, boiler, pump and fittings; four cylinder boilers, 2½ by 40 feet; two cylinder boilers, 2½ by 50 feet. D. S. SEYMOUR, Peekskill, N.Y. 13 3*

J. E. CHENEY, MANUFACTURER OF FILTERS FOR purifying lake, rain and river water, Rochester, N. Y. 13 4*

FOR SAW-GUMMERS ADDRESS DOLE & SILVER, Salem, Ohio, who are the exclusive manufacturers of "Dole's Patent," the best in use. 13 4*

FOR WOODWORTH'S OR DANIEL'S PLANERS AND Sash Machinery address J. A. FAY & CO., or E. C. TAINTER, succeeding partner, Worcester, Mass. 13 and 17 *

DRAWING OFFICE, NO. 406 WALNUT STREET Philadelphia, Pa.—Drawings of every kind neatly executed. 13 4*

FOR WOOD LATHES, SCROLL SAWS, SAW BENCHES and wood-working machinery, address J. A. FAY & CO., or C. TAINTER, succeeding partner, Worcester, Mass. 14 18*

IMPROVED SCROLL CHUCKS, MADE BY A. F. CUSHMAN, Hartford, Conn. Cast-steel Scroll and Jaws, $2 to $5 extra. Address as above. 14 4*

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The publishers of the SCIENTIFIC AMERICAN have just prepared, with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

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Improved Patent Armor for Vessels.

Inventors have been laboring assiduously, of late, to discover the proper means of securing armor to ships-of-war. Different opinions prevail as to the best method for this purpose, some maintaining that rigidity is unnecessary, while others assert that the whole mass should be firmly bound together so as to be, in effect, one plate. Herewith we illustrate a plan for securing the latter feature :—

This invention relates both to armor plates applied on the outside of wooden hulls, and to iron plates attached directly to the frame of the vessel, the frame being either of timber or iron. It also consists in an improved mode of fitting together and combining the marginal portions of the several plates, whereby they are so locked as to hold each plate longitudinally, and also in a vertical direction; and to assist, as well, in holding each other to the sides of the framing of the ship. The necessity of using plates of very large size is thus obviated. The plates, A A, are bolted directly to the wooden framing, B B. The armor plates are of quadrangular form, and each is made with a groove, *a*, near and parallel with each edge, such grooves forming a tongue, C, corresponding in width with the marginal portion of the plate outside of it, the face of the said tongue standing back from the corresponding face of the plate a distance equal to the thickness of the plate at the bottom of the grooves, in order that when the tongue on one plate is inserted in the groove of another one, they may fit together so as to be flush on both sides. This mode of fitting the plates together, it is obvious, will lock them together both lengthwise of the vessel and vertically, and in order to make them all assist in holding each other to the ship, each has one of its horizontal grooves and one of its vertical ones on the outer side, and the other two grooves on the inner side. To enable the plates to be arranged in tiers, one above another, and so that the plates of each tier break joints with those of the tiers above and below, and yet to combine the plates so as to form a continuous solid plating, each horizontal groove is continued the whole length of the plates, but the vertical groove, on the same side, is made to terminate in the horizontal groove, as shown at *c*, in Figs. 1 and 2, and the two corners of the plates, where the vertical groove of one side and the horizontal groove of the other side come together, are cut away in angular form from the inner sides of the two grooves.

Fig. 1

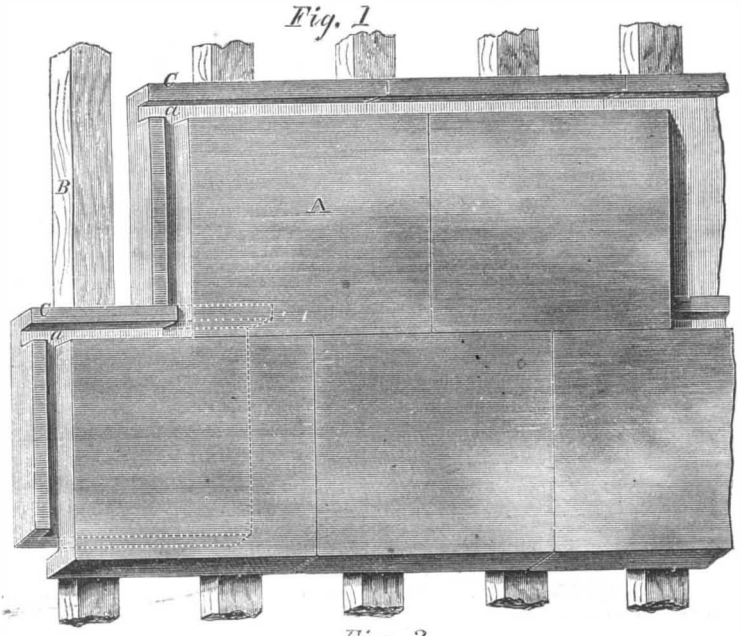
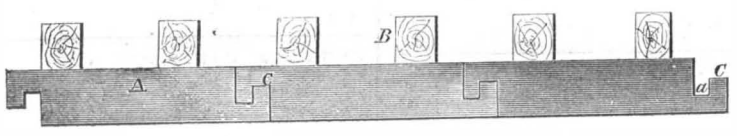


Fig. 2

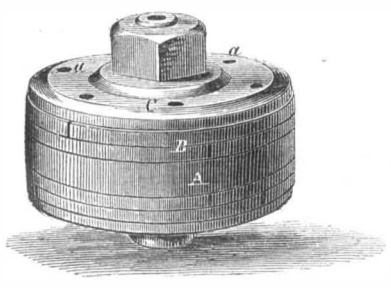


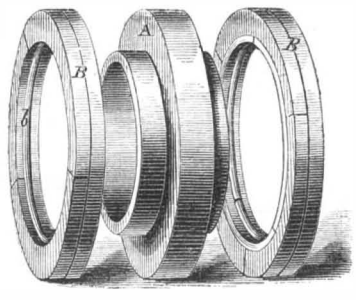
COX'S PATENT ARMOR FOR VESSELS.

The patent for this invention was procured through the Scientific American Patent Agency, on May 27, 1862; further information in regard to it can be had of the inventor, E. Cox, at Point Pleasant, Ohio.

Self-adjusting Steam-pressure Piston Packing.

The importance of keeping the pistons of steam engines perfectly tight cannot be over-estimated, since by so doing a larger portion of the fuel is utilized than when the vapor finds its way around the piston to the opposite end of the cylinder. A great many persons placed in charge of steam engines are entirely ignorant of their duties and may be said to be wholly wanting in a knowledge of the first principles of their business. Such individuals (when they attempt to set out the piston packing particularly) make a botch of every thing they undertake, and not unfrequently damage the most valuable portions of the engine. No such accident can happen in respect to the cylinder where the piston packing here illustrated is employed, since the steam performs the office of brains and adjusts the pressure of the rings against the cylinder to the work in hand. The piston is provided with a follower, as usual, but is without the set screws or springs usually furnished to it. The large ring, A, is provided with two shoulders, which receive the packing rings, B B; these are divided into three or four pieces (as shown by the lines across them), and so arranged as to break joint with each other. The follower, C, has a number of holes, *a*, bored in it which are in connection with the inside of the packing rings. These details comprise the whole invention; the operation of them is very simple.





DUNBAR'S SELF-ADJUSTING STEAM-PRESSURE PISTON PACKING.

When the follower is put on, the large ring retains it at a fixed distance from the opposite flange; the lower ring having been previously placed in position, the upper ones are added and the nut screwed up tight. No further adjustment is required and the piston is ready for service. The steam enters the holes in the follower, when in operation, and forces the rings out to the surface of the cylinder; on the return stroke the exhaust removes the steam and the steam then enters through the holes in the opposite flange of the piston. When the pressure of steam is removed from the piston, the rings of course relax slightly, and prevent that scratching of the cylinder which sometimes results when the engine receives motion from its own momentum; a small band, *b*, internally prevents the rings from rattling or collapsing when the steam pressure is removed. The inventor asserts that it never gets slack or leaky by wear and that it is always steam-tight. It obviates all necessity for springs, and is a very excellent substitute for pistons so fitted. These packing rings are in use in engines in various parts of the country. The western division of the Erie Railroad has forty locomotives supplied with them; they give the greatest satisfaction to all who have used them. Patented August 14, 1860, by H. D. Dunbar, of Hartland Four Corners, Vt. Further information can be had by addressing Labaree & Dunbar at that place.

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